Drainage Reports

Abbreveated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application

ZONING DRAINAGE REPORT

Villages at Troon
Phase 3

Plat #
Case # 27-2N-2016
Q-S #
☑ Accepted
☐ Corrections
N. Baronas 3-6-17
Reviewed By Date

Prepared for:

Asset Management
2701 E. Camelback Road, Suite 170
Phoenix, AZ 85016

Prepared by:

Kimley-Horn and Associates
291071000
February 2017

Kimley»Horn

ZONING DRAINAGE REPORT COMMENT RESPONSE

To: Nerijus Baronas, P.E., CFM
City of Scottsdale (City)

From: Jason Burm, P.E.
Zach Schmidt, P.E., CFM
Kimley-Horn and Associates, Inc. (Kimley-Horn)

Date: February 14, 2017

Subject: Villages at Troon Phase 3
Zoning Drainage Report Review
Case number: 27-ZN-2016

Kimley-Horn prepared a zoning drainage report (report) for Asset Management in November of 2016. The report establishes drainage parameters and criteria for site planning and zoning for the Villages at Troon Phase 3 (Development). The Development is located within the City. The report was submitted to the City on December 9th, 2016. Comments were received on January 3, 2017.

Responses follow each comment in italics.

1. In general, zoning case drainage reports and related information submitted in support of rezoning application should include a 50% level of design and analysis to allow an accurate review of the viability of the proposed project and an in-depth evaluation of the function and design of the stormwater management system by City staff. A number of our comments contained below relate to meeting this requirement and our ability to understand and evaluate the proposed stormwater management system.

   Additional analysis and detail have been provided to the drainage report to support the proposed Stormwater management system. See comment responses below for extent of additional information provided as discussed with the City at meeting held Monday, January 23.

2. The preliminary grading and drainage plan (plan), in conjunction with the report, comprise the two primary pieces of information we review to evaluate the proposed project from a stormwater perspective. As such, the two must provide adequate information to allow this evaluation. Grading and drainage plan was not provided with 1st submittal. Please submit plan with 2nd review.

   The grading and drainage plan is provided. Level of detail with flow and cross section information has been provided as discussed with the City at meeting held Monday, January 23.

3. The report will need to include a summary table for proposed on-site stormwater storage basin(s). The table should include basin identifiers, proposed basin volume(s), orifice size, maximum side slopes, maximum stage depth, inflow rates, peak outflow rates, the difference between peak inflow and outflow rates (attenuation), drain times, maximum storage volumes as determined from HEC-1 model for the 2, 10, and 100-year events, and whether the basin is off-line or in-line.

   On-site stormwater storage basins will not be used for this project. Post-development discharges are below pre-development conditions due to timing of sub-basin hydrographs.

4. HEC-1 model shall provide discharge analysis for the 2, 10, and 100-year events. Clearly depict pre and post development discharges on the plan.

   Outputs for the 2, 10, and 100-year events are provided in Appendices A and B for existing and proposed models, respectively. See Figures 3 and 4 and the "Proposed Onsite Hydrology" section of the report for a summary. Discharges are also indicated on the plan.

5. Show details of proposed improvements within the City right of way.

   A curb cut for street conveyance has been added to the grading and drainage plan to be located within a private tract. No other drainage improvements are within the City right-of-way.

6. The preliminary drainage report will need to illustrate the project is meeting first flush requirements in general. The report should address whether proposed stormwater storage basins have been sized to meet the first flush requirement.

   First flush requirements have been addressed in section "Stormwater Storage Method."

7. For proposed site, privacy, or retaining walls, the top and base of wall elevations should be provided on the plans. Elevations should be provided at ends, changes in elevation, or as needed to provide a reasonable level of definition of the elevations of the walls.

   As discussed with the City at a meeting help Monday, January 23, additional cross section information and conceptual GD plan have been provided for the City's review. It was discussed that additional wall elevations would not be required but location and erosion protection would be identified.

8. Lateral erosion setback analysis is required. Please note, minimum setback for straight and curved wash reaches is 20' and 50', respectively.

   A lateral erosion setback analysis has been performed. See Figure 4 and section "Proposed Onsite Hydraulics" of the report. Erosion will be mitigated with a rock riprap lined channel.

9. The report will need to include wash hydraulics summary table, which will identify wash entrance and exit locations to the proposed development with the following parameters (at a minimum): water surface elevations, critical water surface elevations, velocities, flow areas and channel top widths for pre and post development conditions.

A wash hydraulics summary table is included in the "Proposed Onsite Hydraulics" section of the report. The channel will be protected with riprap.

10. As a result the amount of missing information that allows a thorough analysis of the design and the potential for changes to the stormwater management/grading and drainage design and layout of the project, there will likely be new review comments upon review of subsequent submittals of this case.

ZONING DRAINAGE REPORT

VILLAGES AT TROON

PHASE 3

FEBRUARY 2017

Expires 06/30/19

Prepared By:

Kimley»Horn

Contents

Figures

Tables

Appendices

INTRODUCTION

SITE LOCATION

This Zoning Drainage report has been prepared for the proposed Villages at Troon Phase 3 (Development). The Development is bound to the west by a commercial development, Dynamite Boulevard to the north, Troon North golf course to the east and Running Deer Trail to the south. The Development is located within Section 29 of Township 5 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to **Figure 1** for the Location Map.

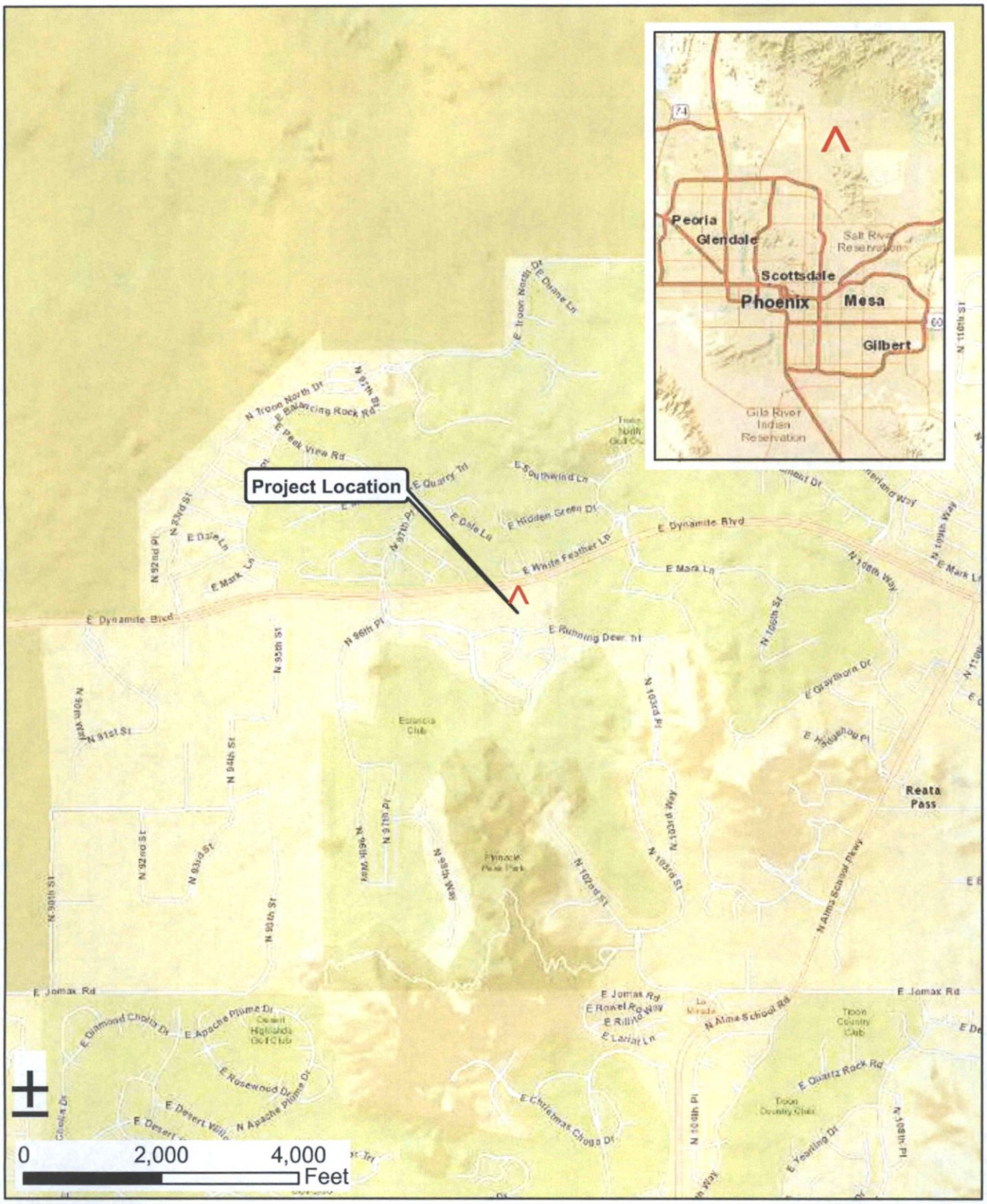
PROJECT SIZE AND TYPE

The Development is a proposed two-acre multi-family development. The proposed development consists of 14 residential units. Currently, the property is an undeveloped desert rangeland. This report is being prepared to re-zone the existing property to R3 ESL and O-S ESL. The proposed site is located within the City of Scottsdale (City) and falls under the City's Environmentally Sensitive Lands Ordinance (ESLO).

PURPOSE AND OBJECTIVES

This report establishes drainage parameters and criteria for site planning and zoning. This report establishes a general hydrologic plan for the development of the site.

- Demonstrate compliance with the City's Design Standards & Polices Manual (DSPM).
- Quantify offsite runoff from the offsite watershed being conveyed through the existing property
- Determine a preliminary hydrologic analysis for both onsite and offsite runoff that meet the pre- versus post-development requirements for the City.



Kimley»Horn Expect More. Experience Better.	Villages at Troon Phase 3	Scottsdale, AZ
	Figure 1. Location Map	

DESCRIPTION OF EXISTING DRAINAGE CONDITIONS AND CHARACTERISTICS

EXISTING ONSITE CONDITIONS

The development consists of undeveloped natural desert with a large wash crossing the site. The development slopes from east to west with an average slope of 2.2%. A significant wash is located in the middle of the development. The wash crosses the development where it discharges into the adjacent commercial development to the west. The wash exits the Development on the west property limits. Refer to **Figure 3** for the Existing Conditions Map.

EXISTING OFFSITE DRAINAGE CONDITIONS

Offsite runoff originates southeast of the development. A small butte is located near Greythorn Drive. Runoff from butte is conveyed west towards the development in a significant wash. Significant washes are defined as having a 100-year peak discharges of 50 cubic feet per second (cfs) or more. The Development is located in the Pinnacle Peak West watershed. The Pinnacle Peak West Area Drainage Master Study (PPWADMS) was completed by the Flood Control District of Maricopa County (FCDMC) in 2013. The two-dimensional model prepared for the PPWADMS was used as a guide for this report. However, no hydrograph results were used for this report.

Three offsite subbasins were delineated using City quarter section topography. Based on results of the two-dimensional model a small split flow from subbasin OFF05 occurs at the end of the cul-de-sac at the end of White Feather Drive. The results of the two-dimensional model were used to determine the amount of runoff going in each direction. The two-dimensional model was used to estimate the split flow using percentages. The hydrographs from the model are not used.

Offsite runoff from the Troon North Golf Course is routed through a golf course retention pond adjacent to the east property line. Peak discharges greater than the capacity of the pond will be conveyed through the northeast corner of the Development to an existing culvert crossing Dynamite Boulevard. The improvements made for the Development will not impact this outfall. Therefore, no additional analysis was done on the golf course pond.

Offsite runoff will be conveyed through the development. There are no washes with 100-year peak discharges of 750 cfs or greater, which indicates that no Vista Corridors exist within the project area. Refer to **Figure 3.** Existing conditions hydrologic results can be found in **Appendix A**.

CONTEXT RELATIVE TO ADJACENT PROJECTS AND IMPROVEMENTS

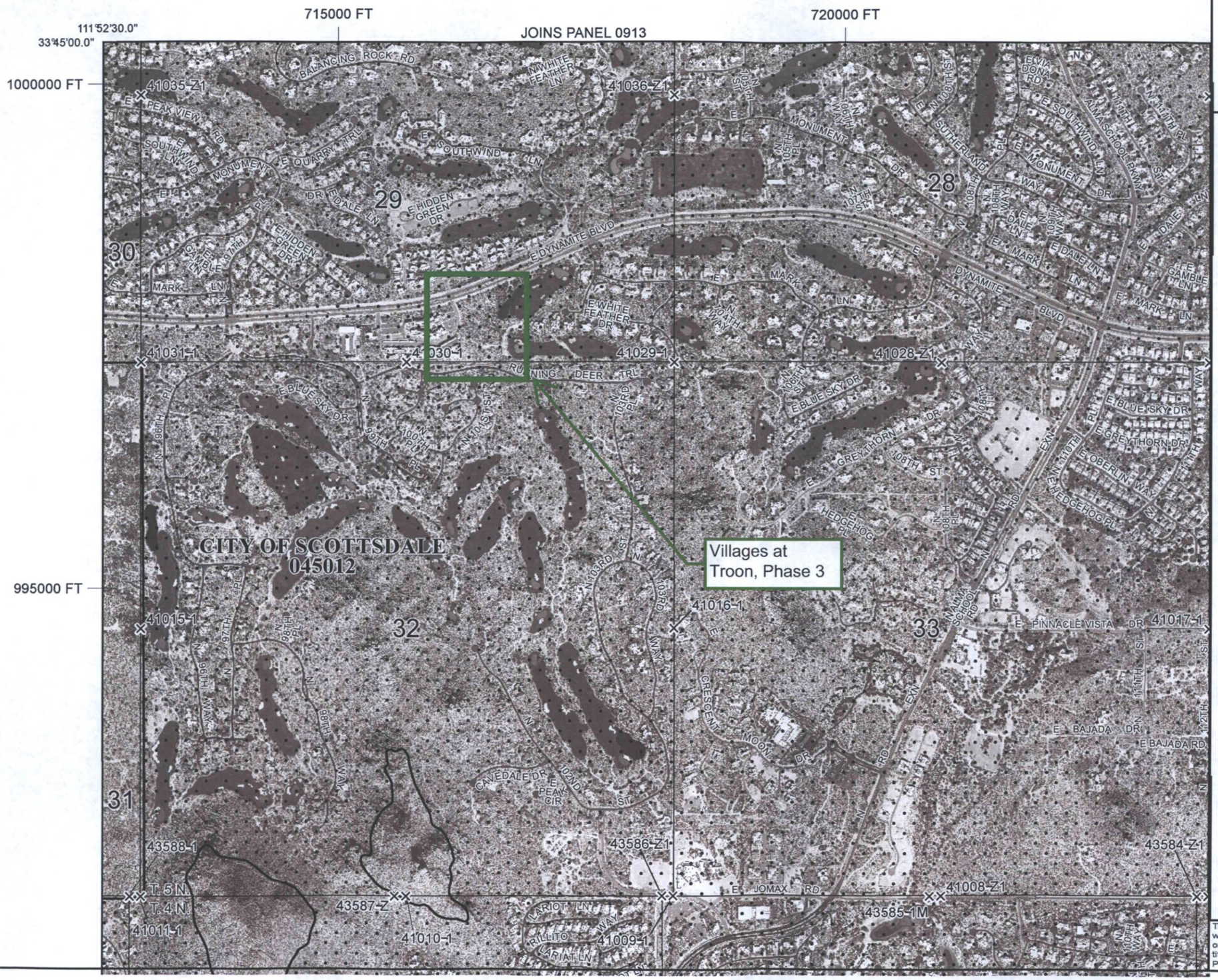
Runoff leaving the site at the property boundary continues to the existing condition on the adjacent commercial development.

FLOOD HAZARD ZONES ON PROPERTY, FIRM MAPS

The development is located within one flood zone as shown on Flood Insurance Rate Map (FIRM) panel number 04013C1330L, dated October 16, 2013. Refer to **Figure 2** for the project FIRM map. The flood zones that pertain to the site are as follows:

> "Other Flood Areas" Zone X – "Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood."

FIGURE 2 - FIRM



...le National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1330L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1330 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SCOTTSDALE, CITY OF	045012	1330	L

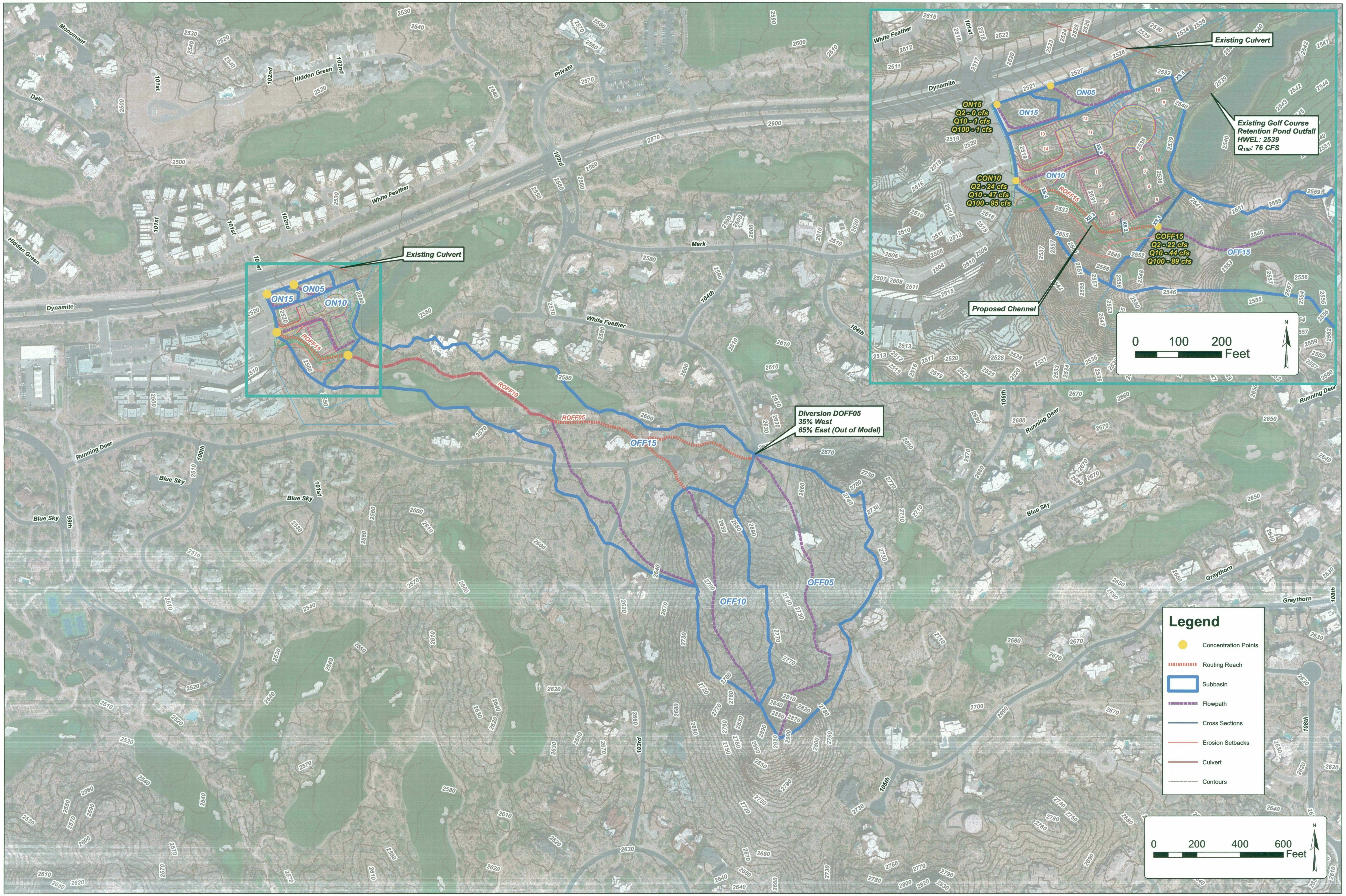
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C1330L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



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CHECKED BY: ZRS
DATE: 2/2017

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2017 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning and Environmental Consultants
7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

CITY OF SCOTTSDALE
VILLAGES AT TROON PHASE 3
PROPOSED CONDITIONS
FIGURE 4

PROJECT NO.
XX
DRAWING NAME
XX

PROPOSED DRAINAGE PLAN

PROPOSED ONSITE DRAINAGE PLAN

The Development consists of 14 multi-family units. Runoff will be conveyed in the streets to the west property line where it exits the site. The post-development peak discharges exiting the site are equal to or less than pre-development peak discharges. Onsite runoff from the Development will pass before the offsite runoff passes through the site. Therefore, detention basins are not required for attenuation of flow. Lots located adjacent to the significant wash will have finished floor elevations a minimum of one foot above the 100-year base flood elevation (BFE) and one foot above adjacent water surface elevations (WSEL). Refer to **Figure 4** for the Proposed Conditions Drainage Map. Refer to **Appendix E** for the Grading and Drainage Plan.

PROPOSED ONSITE HYDROLOGY

Onsite runoff maintains post-development peak discharges at or below pre-development conditions at the exit point for the Development. The onsite runoff exits the site before the offsite runoff is conveyed through the Development. A summary of the pre- and post-development peak discharges is provided in **Table 1**. Refer to **Appendix A** and **Appendix B** for the detailed hydrologic model results.

Table 1. Peak Discharge Summary

HEC-1 Combination Point (Pre/Post)	Pre Q_2 [cfs]	Post Q_2 [cfs]	Pre Q_{10} [cfs]	Post Q_{10} [cfs]	Pre Q_{100} [cfs]	Post Q_{100} [cfs]
CON10/CON10	24	24	48	47	96	95
ON05/ON05	0	0	1	1	2	1
ON15/ON15	0	0	1	0	2	1

PROPOSED ONSITE HYDRAULICS

Onsite runoff will be conveyed in the local streets to the wash crossing the south side of the Development. Per the DS&PM, all interior streets will be designed to convey the peak discharge from the 10-year storm event at or below the top of curb elevation. Additionally, the streets will convey the 100-year runoff within the proposed tracts and maintain a maximum flow depth of eight inches above the gutter flow line. Refer to **Appendix D** for street capacity calculations. Refer to **Figure 4** for a depiction of the analyzed cross section.

The significant wash crossing the Development will be re-routed from the existing condition to the south side of the Development. Lateral erosion setbacks were determined for the proposed channel. The minimum setbacks of 20 feet for straight channel reaches and 50 feet for channels with obvious curvature are required per the Arizona Department of Water Resources State Standard for Watercourse System Sediment Balance (SS5-96). The calculated setbacks were less than the minimum requirement,

therefore the minimum setbacks were used. The scour depth of the channel was determined based on the Natural Resources Conservation Service soil data for the site. The scour depth is approximately two (2) feet for straight portions of the channel and three (3) feet deep for curved portions. The channel will be lined with riprap to mitigate lateral erosion and reduce velocities in the channel. Erosion setbacks are depicted in **Figure 4.**

A proposed condition normal depth analysis for the significant wash was prepared. The analysis was used to determine the BFE of the wash. The pad elevations for each lot are set eight inches above the adjacent BFE, ensuring the lowest finished floor will be at least one foot above the BFE. Additionally, the finished floors will be set a minimum one foot above any adjacent WSEL. A summary of results from the analysis appear below in **Table 2**.

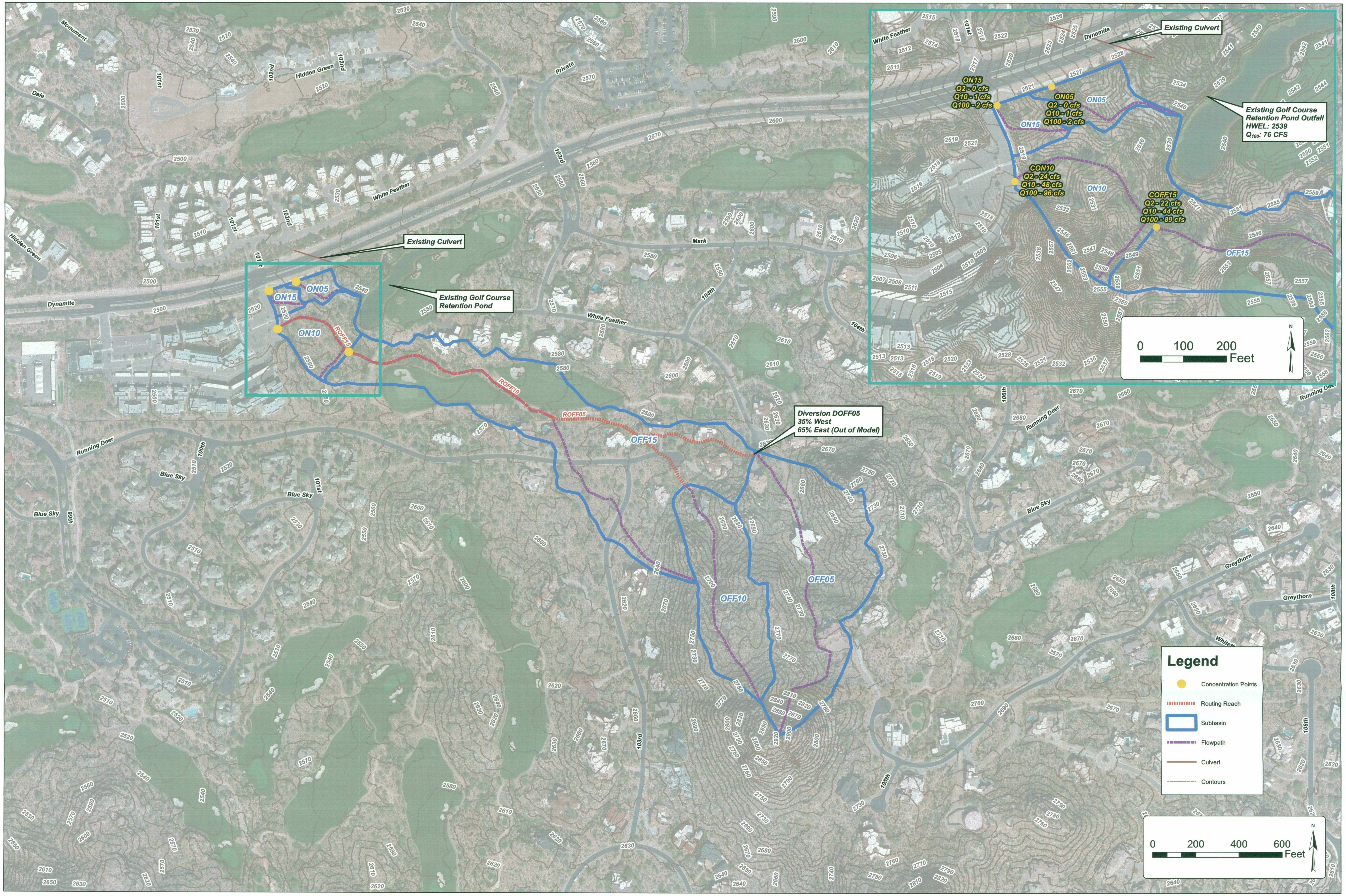
Table 2. Wash Hydraulics Summary

XS	Water Surface Elevation (ft)	Critical Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft^2)	Top Width (ft)
1	2536.75	2536.51	2.1	42.7	82.3
2	2533.97	2533.71	4.8	18.5	14.8
3	2530.77	2530.44	4.4	20.1	18.6
4	2517.92	2517.91	5.9	16.1	14.6

Riprap will be used to reduce velocities in the channel and mitigate lateral erosion. Refer to **Appendix D** for detailed results. Refer to **Figure 4** for a depiction of the cross section locations.

PROPOSED OFFSITE HYDRAULICS

The outfall of the golf course retention basin routes runoff near the northeast corner of the site. A normal depth analysis was prepared for the outfall. Lateral erosion setbacks were determined to be less than the minimum requirement. The minimum setback of 20 feet for a straight reach required by SS5-96 will be mitigated by a cutoff wall along lots on the northeast side corner of the Development. The cutoff wall will be two (2) feet deep based on the scour depth of the channel. Refer to **Appendix D** for preliminary scour depth calculations and the normal depth analysis. Refer to **Figure 4** for a depiction of the cross section.



CITY OF SCOTTSDALE
VILLAGES AT TROON PHASE 3
EXISTING CONDITIONS
FIGURE 3

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DRAWN BY: ZRS
CHECKED BY: XX
DATE: 10/2016

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DATA ANALYSIS METHODS

HYDROLOGY

The U.S. Army Corps of Engineers HEC-1 hydrologic computer program was used to determine the 2-, 10-, and 100-year peak discharges for offsite and onsite subbasins. The PPWADMS was used as a guide for the hydrologic model. Locations of split flows in the PPWADMS two-dimensional model were maintained in the HEC-1 analysis. The results from the two-dimensional model were used to determine the split flow ratios. The peak discharges from the FLO-2D model were not used in the results of this hydrologic analysis. The FLO-2D web tool was provided by FCDMC to review the results of the PPWADMS two-dimensional model. The hydrologic model prepared for this report uses rainfall depths from National Oceanic and Atmospheric Administration Atlas 14 (NOAA 14). The six-hour storm duration was used for this project due to the size of the contributing watershed. Refer to **Appendix A**. The Drainage Design Management System for Windows (DDMSW) program was used to develop the hydrologic parameters for the onsite drainage areas and offsite drainage areas east of the Development. Green and Ampt rainfall loss parameters were estimated using DDMSW, DS&PM and FCDMC Drainage Design Manual – Hydrology. The Clark unit hydrograph was used. Flowpaths were developed using the City of Scottsdale quarter section topography.

Two different soil types were identified for the onsite and offsite subbasins using the web soil survey from the National Resource Conservation Service (NRCS). A map showing the different soil types is shown in **Appendix A** and **Appendix B.** A list of the soils found in the watershed is shown below:

- Gran-Wickenburg complex, 1 to 10 percent slopes (64561)
- Gran-Wickenburg-Rock outcrop complex, 1 to 7 percent slopes (64563)

Land use types for the HEC-1 models were based on aerial photography. The existing land use are undeveloped desert, golf course and low density residential. Land use parameters were not modified except for the mountainous portions of the undeveloped desert. The percent impervious was modified to 20%. This is similar to the parameters from the PPWADMS. The post-development condition land use was revised to include the Development being re-zoned to R1-3. Land use maps for the existing and proposed development conditions are provided in **Appendix A** and **Appendix B.**

Hydrology for the golf course retention basin was based on the *Basin 3 Troon North Master Hydrology Report*. The basin appears in the HEC-1 model prepared with the report as DETG9. The 100-year outflow of 76 cfs was used. Refer to **Appendix F** for the report.

HYDRAULICS

A preliminary hydraulic model of the proposed relocation of the onsite wash was prepared using Bentley FlowMaster V8i. Four representative cross sections with riprap lining were modelled for the 100-year storm. Refer to **Appendix D** for FlowMaster results.

Lateral erosion setbacks were evaluated using SS5-96. Riprap lining will be used to mitigate lateral erosion. The scour depth of the channel was estimated using DDMSW. Long-term scour was calculated using the 100-year peak flow in the channel. General scour was evaluated using the Lacey equation. The mean grain size was assumed to be 0.5 mm, based on soil data from NRCS. Low flow scour was assumed to be one (1) foot. The scour depth will be refined during final design with further geotechnical analysis. Refer to **Appendix D** for scour depth calculations.

The outflow from the offsite golf course retention basin was analyzed using FlowMaster. A representative cross section was modelled for the 100-year outflow. Refer to **Appendix D** for FlowMaster results.

STORMWATER STORAGE METHOD

The existing property is a part of the ESLO. Based on new City ordinances, a waiver will need to be obtained for any volume less than the 100-year, 2-hour volume. However, there is no waiver fee associated with the volumes that do not result in an increase in downstream runoff. Onsite runoff passes through the site before the offsite runoff peak discharge reaches the site. See **Appendix C** for a copy of the waiver.

An alternative method such as a Stormceptor is proposed to meet first flush criteria. It is important to note that the downstream discharge location enters a parking lot owned by the same landowner. It is recommended given the downstream condition that a reduction in first flush criteria be contemplated for this project.

CONCLUSIONS

- Hydrologic models were prepared for the onsite and offsite areas for the pre- and post-development conditions. The PPWADMS two-dimensional model was used as a guide. Split flow ratios in the offsite subbasins were estimated from the PPWADMS results. The Development will not increase post-development peak discharges exiting the site from the pre-development conditions. Onsite runoff will pass through the site prior to the offsite runoff peak discharges reaching the site.

- One significant wash crosses the development. The Development will re-route the wash to the southern portion of the site. The improved wash will exit the Development at its existing location. Scour and lateral erosion calculations were performed to determine the level of protection needed for the Development.

- Finished floor elevations will be set at a minimum of one foot above the wash BFE and adjacent WSEL. A preliminary hydraulic analysis was completed to determine the adjacent WSEL.

- Onsite runoff will be conveyed through the local streets to the exit location on the west side of the Development.

- The first flush will be treated using an alternative method such as a Stormceptor. It is important to note that the downstream discharge location enters a parking lot owned by the same landowner. It is recommended that a reduction in first flush criteria be contemplated for this project given the downstream condition.

REFERENCES

Arizona Department of Water Resources, *State Standard for Watercourse System Sediment Balance*, September 1996.

City of Scottsdale, *Design Standards and Policies Manual,* January 2010.

Flood Control District of Maricopa County, *Pinnacle Peak West Area Drainage Master Plan*, 2013.

Federal Emergency Management Agency, Flood Insurance Rate Map Panel No04013C1330L, dated October 2013.

Flood Control District of Maricopa County, *Drainage Design Manual – Hydrology*, updated August 15, 2013.

Gilbertson Associates, Inc., *Basin 3 Troon North Master Hydrology Report*, 1996.

City of Scottsdale Topography Quarter Section Maps.

Appendix A Existing Conditions Hydrology

- *NOAA 14 Rainfall*
- *Existing Conditions Soils*
- *Existing Conditions Land Use*
- *Subbasin Hydrologic parameters*
- *Routing Reaches*
- *HEC-1 Results*

Appendix A Existing Conditions Hydrology

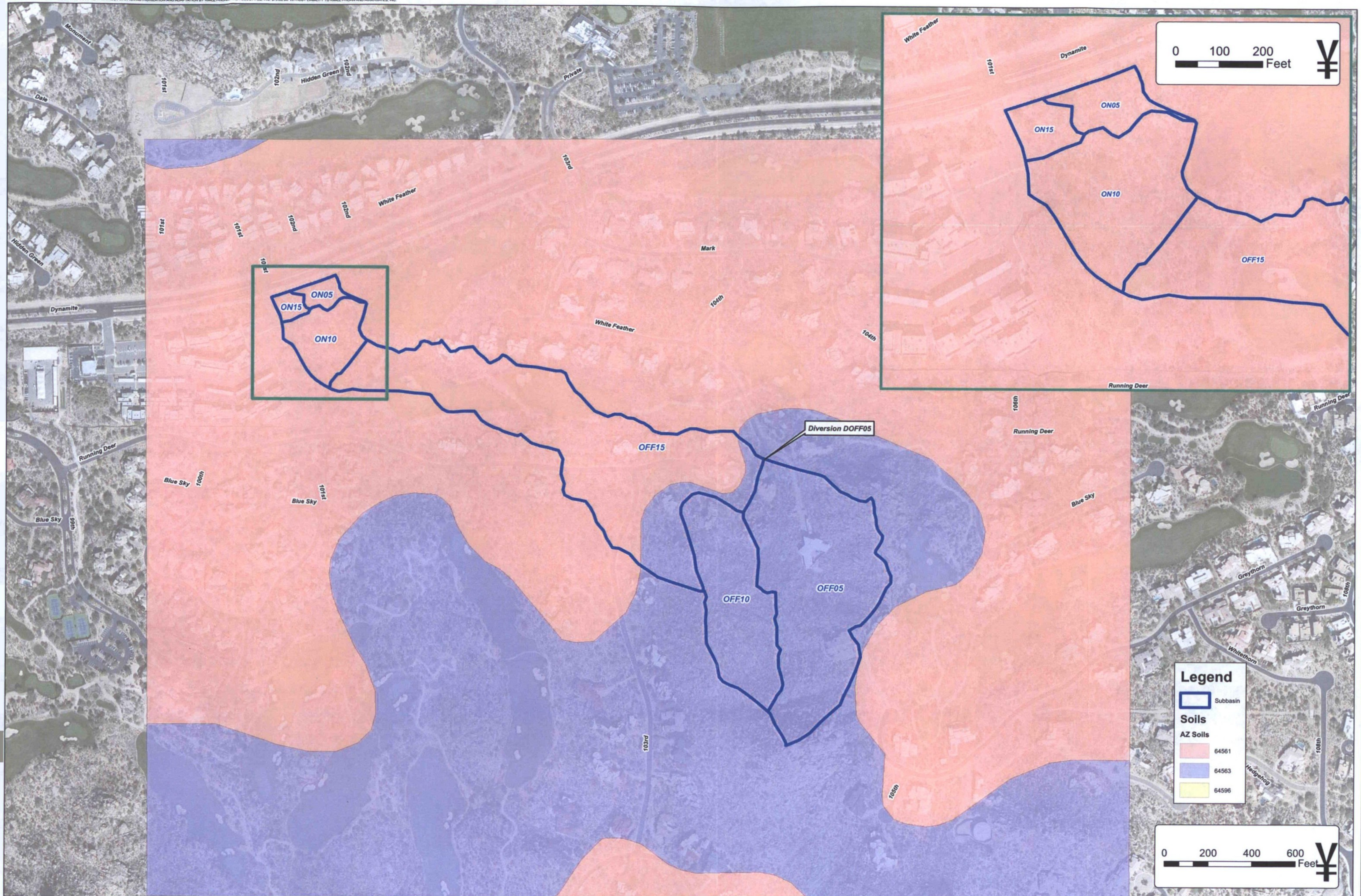
- *NOAA 14 Rainfall*

City of Scottsdale
Drainage Design Management System
RAINFALL DATA
Project Reference: TROONEX

ID	Method	Duration	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
DEFAULT	NOAA14	5 MIN	0.307	0.414	0.495	0.602	0.683	0.766
	NOAA14	10 MIN	0.468	0.631	0.754	0.917	1.040	1.165
	NOAA14	15 MIN	0.580	0.782	0.934	1.136	1.289	1.444
	NOAA14	30 MIN	0.781	1.053	1.258	1.530	1.736	1.945
	NOAA14	1 HOUR	0.966	1.303	1.557	1.894	2.149	2.407
	NOAA14	2 HOUR	1.108	1.470	1.749	2.125	2.410	2.705
	NOAA14	3 HOUR	1.179	1.535	1.819	2.214	2.526	2.850
	NOAA14	6 HOUR	1.390	1.764	2.062	2.474	2.797	3.130
	NOAA14	12 HOUR	1.662	2.086	2.423	2.880	3.232	3.593
	NOAA14	24 HOUR	2.009	2.618	3.112	3.812	4.380	4.983

Appendix A Existing Conditions Hydrology

- *Existing Conditions Soils*



CITY OF SCOTTSDALE
VILLAGES AT TROON PHASE 3
EXISTING CONDITIONS
SOILS

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CHECKED BY:	XX
DATE:	10/2016

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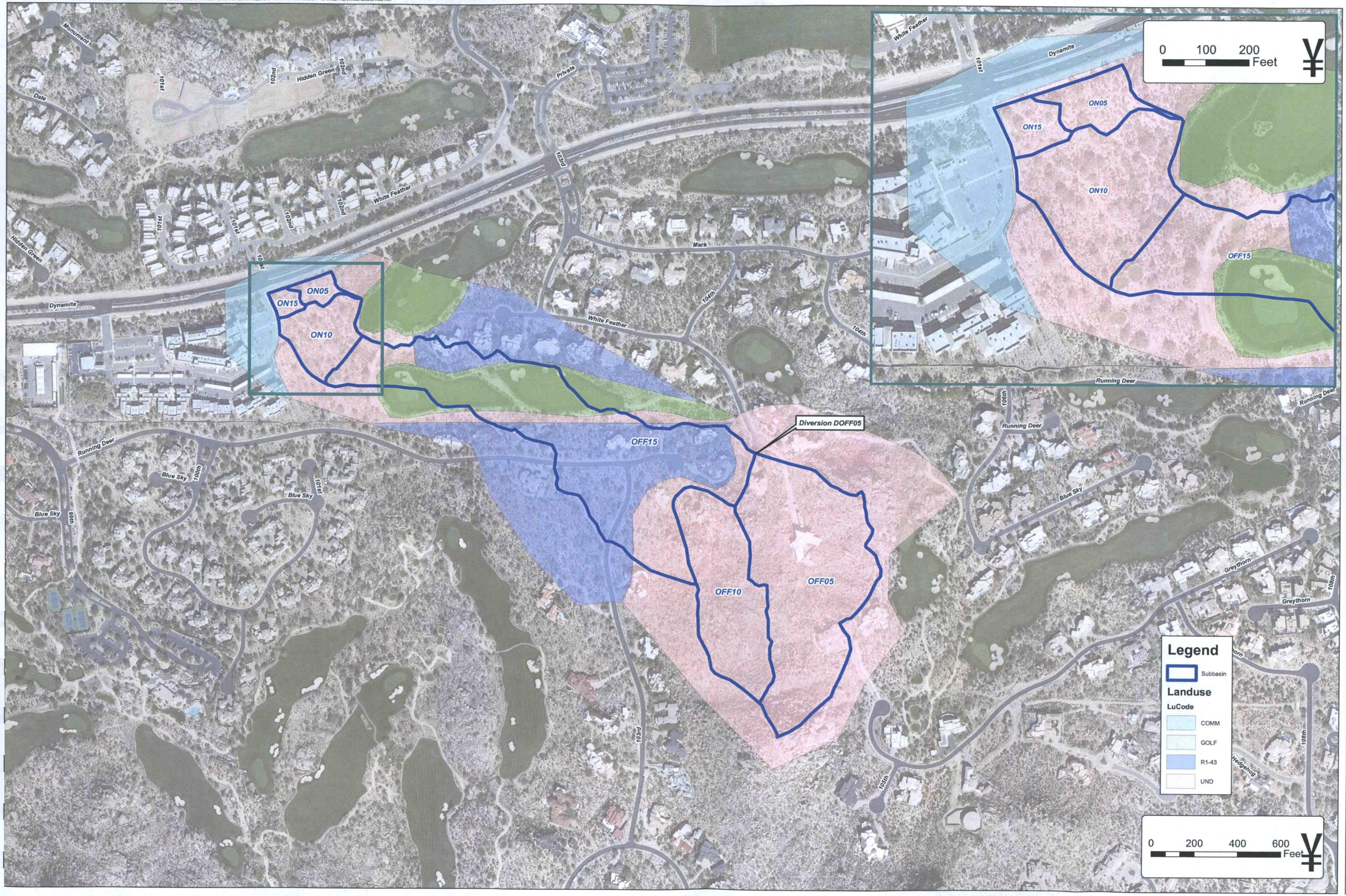
PROJECT NO.
XX

DRAWING NAME
XX

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
OFF05	645	63	64563	0.019	100.00	0.140	25.00	100	
OFF10	645	63	64563	0.010	100.00	0.140	25.00	100	
OFF15	645	61	64561	0.022	82.80	0.150	-	100	
	645	63	64563	0.005	17.20	0.140	25.00	100	
ON05	645	61	64561	0.001	100.00	0.150	-	100	
ON10	645	61	64561	0.004	100.00	0.150	-	100	
ON15	645	61	64561	0.001	100.00	0.150	-	100	

Appendix A Existing Conditions Hydrology

- *Existing Conditions Land Use*



CITY OF SCOTTSDALE
VILLAGES AT TROON PHASE 3
EXISTING CONDITIONS
LANDUSE

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Phoenix, Arizona 85020 (602) 944-5500

PROJECT NO.
XX

DRAWING NAME
XX

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: TROONEX

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb	Description
Major Basin ID: 01									
OFF05	UND	0.0190	100.0	0.25	20 *	0.0	DRY	0.123	Undisturbed natural desert or desert landscaping (no impervi
		0.0190	**100.0**						
OFF10	UND	0.0096	100.0	0.25	20 *	0.0	DRY	0.130	Undisturbed natural desert or desert landscaping (no impervi
		0.0096	**100.0**						
OFF15	GOLF	0.0059	22.6	0.44	0	60.0	NORMAL	0.032	Golf Course
	R1-43	0.0127	48.7	0.30	17	20.0	NORMAL	0.032	Residential 43,000 sq-ft lots
	UND	0.0075	28.7	0.25	20 *	0.0	DRY	0.119	Undisturbed natural desert or desert landscaping (no impervi
		0.0261	**100.0**						
ON05	UND	0.0008	100.0	0.25	0	0.0	DRY	0.155	Undisturbed natural desert or desert landscaping (no impervi
		0.0008	**100.0**						
ON10	UND	0.0035	100.0	0.25	0	0.0	DRY	0.140	Undisturbed natural desert or desert landscaping (no impervi
		0.0035	**100.0**						
ON15	UND	0.0006	100.0	0.25	0	0.0	DRY	0.155	Undisturbed natural desert or desert landscaping (no impervi
		0.0006	**100.0**						

* Non default value

Appendix A Existing Conditions Hydrology

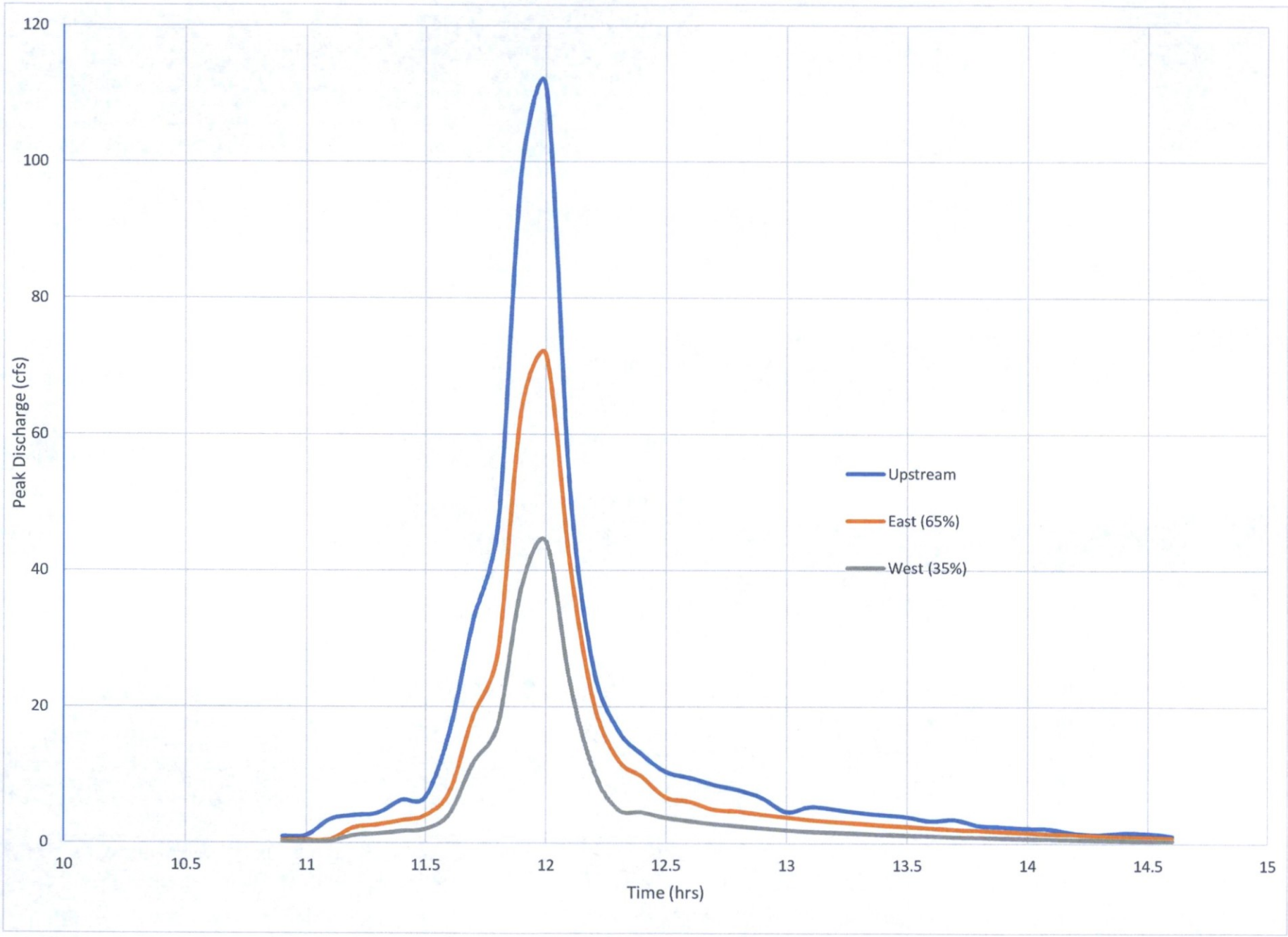
- *Subbasin Parameters*

Area ID	Sub Basin Parameters: Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	Rainfall Losses: IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		Return Period Parameters: 2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
OFF05	0.019	0.30	979.7	313.0	NATURAL	0.123	0.25	0.39	6.16	0.140	45	**Tc (Hrs)**	0.353	0.342	0.316	0.288	0.270	0.256
												Vel (f/s)	1.25	1.29	1.39	1.53	1.63	1.72
												R (Hrs)	0.426	0.411	0.376	0.339	0.317	0.298
OFF15	0.026	0.41	431.0	293.7	NATURAL	0.057	0.32	0.29	6.00	0.171	18	**Tc (Hrs)**	0.311	0.299	0.272	0.243	0.225	0.212
												Vel (f/s)	1.93	2.01	2.21	2.47	2.67	2.84
												R (Hrs)	0.397	0.380	0.342	0.301	0.278	0.260
OFF10	0.010	0.21	1009.6	313.0	NATURAL	0.130	0.25	0.39	6.16	0.140	45	**Tc (Hrs)**	0.304	0.295	0.272	0.248	0.233	0.221
												Vel (f/s)	1.01	1.04	1.13	1.24	1.32	1.39
												R (Hrs)	0.391	0.377	0.346	0.311	0.291	0.274
ON05	0.001	0.06	285.7	257.9	NATURAL	0.155	0.25	0.40	6.00	0.150		**Tc (Hrs)**	0.225	0.215	0.193	0.169	0.156	0.146
												Vel (f/s)	0.39	0.41	0.46	0.52	0.56	0.60
												R (Hrs)	0.382	0.363	0.321	0.278	0.254	0.236
ON10	0.004	0.11	301.9	264.1	NATURAL	0.140	0.25	0.40	6.00	0.150		**Tc (Hrs)**	0.287	0.274	0.245	0.215	0.199	0.186
												Vel (f/s)	0.56	0.59	0.66	0.75	0.81	0.87
												R (Hrs)	0.368	0.350	0.310	0.268	0.245	0.227
ON15	0.001	0.04	297.3	262.4	NATURAL	0.155	0.25	0.40	6.00	0.150		**Tc (Hrs)**	0.183	0.175	0.156	0.137	0.126	0.118
												Vel (f/s)	0.32	0.34	0.38	0.43	0.47	0.50
												R (Hrs)	0.219	0.208	0.184	0.159	0.146	0.135

Appendix A Existing Conditions Hydrology

- *Routing Reaches*


West Cross Section
Qpeak = 44 cfs
East Cross Section
Qpeak = 72 cfs
Upstream Cross Section
Qpeak = 111 cfs
White Feather Ln


120
100
80
60
40
20
0
Peak Discharge (cfs)
10
10.5
11
11.5
12
12.5
13
13.5
14
14.5
15
Time (hrs)
Upstream
East (65%)
West (35%)

City of Scottsdale
Drainage Design Management System
HEC-1 DIVERSIONS
Project Reference: TROONEX

Diversion ID/ DT Card ID	Maximum Volume (ac-ft)	Maximum Diversion (cfs)		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
DOFF05			**Inflow (cfs)**		100	200	500	1,000	2,000	4,000	10,000	20,000	50,000
DTFF05			**Diversion (cfs)**		65	130	325	650	1,300	2,600	6,500	13,000	32,500

City of Scottsdale
Drainage Design Management System
HEC-1 ROUTING DATA
Project Reference: TROONEX

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
ROFF05	0.040	0.040	0.040	2,061.00	0.0460	-	X:	-	3.00	6.00	37.00	45.00	52.00	58.00	65.00
							Y:	2,550.00	2,449.00	2,448.00	2,446.00	2,447.00	2,448.00	2,449.00	2,550.00
ROFF10	0.040	0.040	0.040	1,811.00	0.0460	-	X:	-	3.00	6.00	37.00	45.00	52.00	58.00	65.00
							Y:	2,550.00	2,449.00	2,448.00	2,446.00	2,447.00	2,448.00	2,449.00	2,550.00
ROFF15	0.040	0.040	0.040	406.00	0.0220	-	X:	-	5.00	7.00	12.00	14.00	27.00	54.00	68.00
							Y:	2,535.00	2,534.00	2,533.00	2,531.00	2,531.00	2,532.00	2,533.00	2,534.00

Appendix A Existing Conditions Hydrology

- *HEC-1 Results*

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   30JAN17  TIME  14:02:11   *
*                                       *
*****************************************
```

Existing 2-year

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        City of Scottsdale
   2          ID        TROONEX - Villages at Troon Phase 3
   3          ID        2 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        01/30/2017
              *DIAGRAM
   8          IT       2  1JAN99       0    2000
   9          IO       5
  10          IN      15
              *
  11          JD   1.390  0.0001
  12          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  13          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  14          PC   0.962   0.972   0.983   0.991   1.000
  15          JD   1.382  0.5000
  16          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  17          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  18          PC   0.962   0.972   0.983   0.991   1.000
              *
  19          KK   OFF05   BASIN
  20          BA   0.019
  21          LG    0.25    0.39    6.16    0.14      45
  22          UC   0.353   0.426
  23          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  24          UA     100
              *
  25          KK  DOFF05  DIVERT
  26          DT  DTFF05     0.0     0.0
  27          DI     0.0   100.0   200.0   500.0  1000.0  2000.0  4000.0 10000.0 20000.0 50000.0
  28          DQ     0.0    65.0   130.0   325.0   650.0  1300.0  2600.0  6500.0 13000.0 32500.0
              *
  29          KK  ROFF05   ROUTE
  30          RS       1    FLOW
  31          RC   0.040   0.040   0.040    2061  0.0460    0.00
  32          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
  33          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
              *
  34          KK   OFF10   BASIN
  35          BA   0.010
  36          LG    0.25    0.39    6.16    0.14      45
  37          UC   0.304   0.391
  38          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  39          UA     100
              *
```

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

```
 40          KK  ROFF10   ROUTE
 41          RS       1    FLOW
 42          RC   0.040   0.040   0.040    1811  0.0460    0.00
 43          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
 44          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
             *

 45          KK   OFF15   BASIN
 46          BA   0.026
 47          LG    0.32    0.29    6.00    0.17      18
 48          UC   0.311   0.397
 49          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 50          UA     100
             *

 51          KK  COFF15 COMBINE
 52          HC       3
             *

 53          KK  ROFF15   ROUTE
 54          RS       1    FLOW
 55          RC   0.040   0.040   0.040     406  0.0220    0.00
 56          RX    0.00    5.00    7.00   12.00   14.00   27.00   54.00   68.00
 57          RY  2535.0 2534.00 2533.00 2531.00 2531.00 2532.00 2533.00 2534.00
             *

 58          KK    ON10   BASIN
 59          BA   0.004
 60          LG    0.25    0.40    6.00    0.15       0
 61          UC   0.287   0.368
 62          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 63          UA     100
             *

 64          KK   CON10 COMBINE
 65          HC       2
             *

 66          KK    ON05   BASIN
 67          BA  0.0008
 68          LG    0.25    0.40    6.00    0.15       0
 69          UC   0.225   0.382
 70          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 71          UA     100
             *

 72          KK    ON15   BASIN
 73          BA  0.0006
 74          LG    0.25    0.40    6.00    0.15       0
 75          UC   0.183   0.219
 76          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 77          UA     100
             *
 78          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   19       OFF05
               .
               .
   26          .-------->  DTFF05
   25       DOFF05
               V
               V
   29       ROFF05
               .
               .
   34          .       OFF10
               .          V
               .          V
   40          .      ROFF10
               .          .
               .          .
   45          .          .       OFF15
               .          .          .
               .          .          .
   51       COFF15.......................
               V
               V
   53       ROFF15
               .
               .
   58          .        ON10
               .          .
               .          .
   64        CON10............
               .
               .
   66          .        ON05
```

```
                .          .
                .          .
   72           .          .        ON15

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   30JAN17  TIME  14:02:11   *
*                                       *
*****************************************

*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*         609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************

                          City of Scottsdale
                          TROONEX - Villages at Troon Phase 3
                          2 YEAR
                          6 Hour  Storm
                          Unit Hydrograph: Clark
                          Storm: Multiple
                          01/30/2017

  9 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN99  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      3JAN99  ENDING DATE
                      NDTIME        1838  ENDING TIME
                      ICENT          19  CENTURY MARK

                    COMPUTATION INTERVAL      .03 HOURS
                        TOTAL TIME BASE   66.63 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

 11 JD          INDEX STORM NO. 1
                       STRM        1.39  PRECIPITATION DEPTH
                       TRDA         .00  TRANSPOSITION DRAINAGE AREA

 12 PI            PRECIPITATION PATTERN
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .01       .01       .01
                    .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                    .02       .02       .04       .06       .06       .06       .06       .06       .06       .06
                    .01       .01       .01       .01       .01       .01       .01       .01       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

 15 JD          INDEX STORM NO. 2
                       STRM        1.38  PRECIPITATION DEPTH
                       TRDA         .50  TRANSPOSITION DRAINAGE AREA

 16 PI            PRECIPITATION PATTERN
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .01       .01       .01
                    .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
```

.02	.02	.04	.06	.06	.06	.06	.06	.06	.06
.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT	OFF05	11.	4.23	2.	0.	0.	.02		
+	DIVERSION TO	DTFF05	7.	4.23	1.	0.	0.	.02		
	HYDROGRAPH AT	DOFF05	4.	4.23	1.	0.	0.	.02		
+	ROUTED TO	ROFF05	4.	4.27	1.	0.	0.	.02		
	HYDROGRAPH AT	OFF10	6.	4.20	1.	0.	0.	.01		
+	ROUTED TO	ROFF10	6.	4.23	1.	0.	0.	.01		
	HYDROGRAPH AT	OFF15	12.	4.20	2.	0.	0.	.03		
	3 COMBINED AT	COFF15	22.	4.23	3.	1.	0.	.05		
+	ROUTED TO	ROFF15	22.	4.23	3.	1.	0.	.05		
	HYDROGRAPH AT	ON10	2.	4.20	0.	0.	0.	.00		
+	2 COMBINED AT	CON10	24.	4.23	3.	1.	0.	.06		
	HYDROGRAPH AT	ON05	0.	4.13	0.	0.	0.	.00		
+	HYDROGRAPH AT	ON15	0.	4.10	0.	0.	0.	.00		

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   11OCT16  TIME  13:16:31   *
*                                       *
*****************************************
```

Existing 10-year

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        City of Scottsdale
   2          ID        TROONEX - Villages at Troon Phase 3
   3          ID        10 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        10/11/2016
              *DIAGRAM
   8          IT       2  1JAN99       0    2000
   9          IO       5
  10          IN      15
              *
  11          JD   2.062  0.0001
  12          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  13          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  14          PC   0.962   0.972   0.983   0.991   1.000
  15          JD   2.050  0.5000
  16          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  17          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  18          PC   0.962   0.972   0.983   0.991   1.000
              *

  19          KK   OFF05   BASIN
  20          BA   0.019
  21          LG    0.25    0.39    6.16    0.14      45
  22          UC   0.316   0.376
  23          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  24          UA     100
              *

  25          KK  DOFF05  DIVERT
  26          DT  DTFF05     0.0     0.0
  27          DI     0.0   100.0   200.0   500.0  1000.0  2000.0  4000.0 10000.0 20000.0 50000.0
  28          DQ     0.0    65.0   130.0   325.0   650.0  1300.0  2600.0  6500.0 13000.0 32500.0
              *

  29          KK  ROFF05   ROUTE
  30          RS       3    FLOW
  31          RC   0.040   0.040   0.040    2061  0.0460    0.00
  32          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
  33          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
              *

  34          KK   OFF10   BASIN
  35          BA   0.010
  36          LG    0.25    0.39    6.16    0.14      45
  37          UC   0.272   0.346
  38          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  39          UA     100
              *
```

HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
```

```
 40          KK  ROFF10   ROUTE
 41          RS       3    FLOW
 42          RC   0.040   0.040   0.040    1811  0.0460    0.00
 43          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
 44          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
             *

 45          KK   OFF15   BASIN
 46          BA   0.026
 47          LG    0.32    0.29    6.00    0.17      18
 48          UC   0.272   0.342
 49          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 50          UA     100
             *

 51          KK  COFF15 COMBINE
 52          HC       3
             *

 53          KK  ROFF15   ROUTE
 54          RS       1    FLOW
 55          RC   0.040   0.040   0.040     406  0.0220    0.00
 56          RX    0.00    5.00    7.00   12.00   14.00   27.00   54.00   68.00
 57          RY  2535.0 2534.00 2533.00 2531.00 2531.00 2532.00 2533.00 2534.00
             *

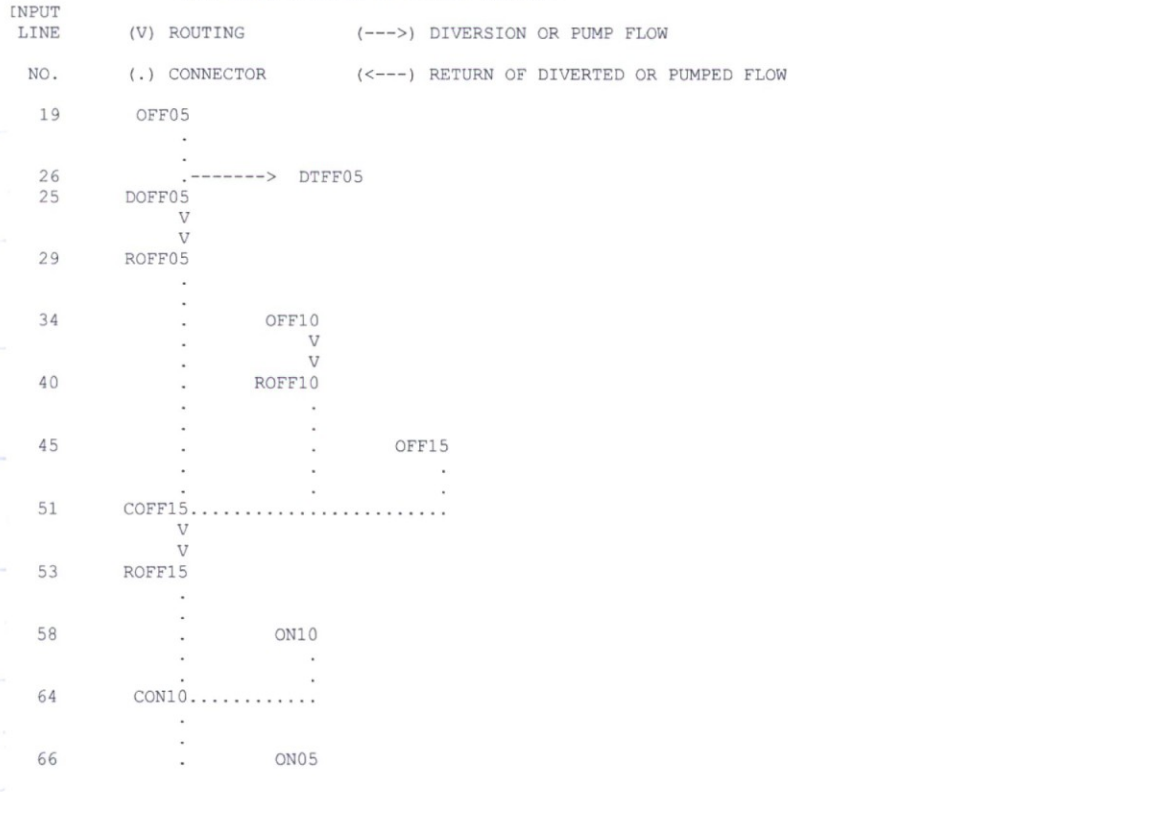
 58          KK    ON10   BASIN
 59          BA   0.004
 60          LG    0.25    0.40    6.00    0.15       0
 61          UC   0.245   0.310
 62          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 63          UA     100
             *

 64          KK   CON10 COMBINE
 65          HC       2
             *

 66          KK    ON05   BASIN
 67          BA  0.0008
 68          LG    0.25    0.40    6.00    0.15       0
 69          UC   0.193   0.321
 70          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 71          UA     100
             *

 72          KK    ON15   BASIN
 73          BA  0.0006
 74          LG    0.25    0.40    6.00    0.15       0
 75          UC   0.156   0.184
 76          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 77          UA     100
             *
 78          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



```
                .          .
                .          .
   72           .          .        ON15

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   11OCT16  TIME  13:16:31   *
*                                       *
*****************************************

*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************

                            City of Scottsdale
                            TROONEX - Villages at Troon Phase 3
                            10 YEAR
                            6 Hour  Storm
                            Unit Hydrograph: Clark
                            Storm: Multiple
                            10/11/2016

   9 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN          2  MINUTES IN COMPUTATION INTERVAL
                      IDATE     1JAN99  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     3JAN99  ENDING DATE
                     NDTIME       1838  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .03 HOURS
                      TOTAL TIME BASE    66.63 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

  11 JD          INDEX STORM NO. 1
                       STRM        2.06  PRECIPITATION DEPTH
                       TRDA         .00  TRANSPOSITION DRAINAGE AREA

  12 PI            PRECIPITATION PATTERN
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .01   .01   .01
                   .01   .01   .01   .01   .01   .02   .02   .02   .02   .02
                   .02   .02   .04   .06   .06   .06   .06   .06   .06   .06
                   .01   .01   .01   .01   .01   .01   .01   .01   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00

  15 JD          INDEX STORM NO. 2
                       STRM        2.05  PRECIPITATION DEPTH
                       TRDA         .50  TRANSPOSITION DRAINAGE AREA

  16 PI            PRECIPITATION PATTERN
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .01   .01   .01
                   .01   .01   .01   .01   .01   .02   .02   .02   .02   .02
```

.02	.02	.04	.06	.06	.06	.06	.06	.06	.06
.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT	OFF05	21.	4.20	3.	1.	0.	.02		
.	DIVERSION TO	DTFF05	13.	4.20	2.	0.	0.	.02		
	HYDROGRAPH AT	DOFF05	7.	4.20	1.	0.	0.	.02		
+	ROUTED TO	ROFF05	7.	4.23	1.	0.	0.	.02		
	HYDROGRAPH AT	OFF10	11.	4.17	1.	0.	0.	.01		
+	ROUTED TO	ROFF10	11.	4.20	1.	0.	0.	.01		
	HYDROGRAPH AT	OFF15	26.	4.17	3.	1.	0.	.03		
	3 COMBINED AT	COFF15	44.	4.20	5.	1.	0.	.05		
.	ROUTED TO	ROFF15	44.	4.20	5.	1.	0.	.05		
	HYDROGRAPH AT	ON10	4.	4.17	0.	0.	0.	.00		
+	2 COMBINED AT	CON10	48.	4.20	6.	1.	1.	.06		
	HYDROGRAPH AT	ON05	1.	4.13	0.	0.	0.	.00		
+	HYDROGRAPH AT	ON15	1.	4.07	0.	0.	0.	.00		

** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   11OCT16  TIME  13:16:44   *
*                                       *
*****************************************
```

Existing 100-year

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X        XXXXX  X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        City of Scottsdale
   2          ID        TROONEX - Villages at Troon Phase 3
   3          ID        100 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        10/11/2016
              *DIAGRAM
   8          IT       2  1JAN99       0    2000
   9          IO       5
  10          IN      15
              *
  11          JD   3.130  0.0001
  12          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  13          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  14          PC   0.962   0.972   0.983   0.991   1.000
  15          JD   3.111  0.5000
  16          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  17          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  18          PC   0.962   0.972   0.983   0.991   1.000
              *

  19          KK   OFF05   BASIN
  20          BA   0.019
  21          LG    0.25    0.39    6.16    0.14      45
  22          UC   0.256   0.298
  23          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  24          UA     100
              *

  25          KK  DOFF05  DIVERT
  26          DT  DTFF05     0.0     0.0
  27          DI     0.0   100.0   200.0   500.0  1000.0  2000.0  4000.0 10000.0 20000.0 50000.0
  28          DQ     0.0    65.0   130.0   325.0   650.0  1300.0  2600.0  6500.0 13000.0 32500.0
              *

  29          KK  ROFF05   ROUTE
  30          RS       3    FLOW
  31          RC   0.040   0.040   0.040    2061  0.0460    0.00
  32          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
  33          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
              *

  34          KK   OFF10   BASIN
  35          BA   0.010
  36          LG    0.25    0.39    6.16    0.14      45
  37          UC   0.221   0.274
  38          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  39          UA     100
              *
```

HEC-1 INPUT PAGE 2

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

```
 40          KK  ROFF10   ROUTE
 41          RS       3    FLOW
 42          RC   0.040   0.040   0.040    1811  0.0460    0.00
 43          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
 44          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
                 *

 45          KK   OFF15   BASIN
 46          BA   0.026
 47          LG    0.32    0.29    6.00    0.17      18
 48          UC   0.212   0.260
 49          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 50          UA     100
                 *

 51          KK  COFF15 COMBINE
 52          HC       3
                 *

 53          KK  ROFF15   ROUTE
 54          RS       1    FLOW
 55          RC   0.040   0.040   0.040     406  0.0220    0.00
 56          RX    0.00    5.00    7.00   12.00   14.00   27.00   54.00   68.00
 57          RY  2535.0 2534.00 2533.00 2531.00 2531.00 2532.00 2533.00 2534.00
                 *

 58          KK    ON10   BASIN
 59          BA   0.004
 60          LG    0.25    0.40    6.00    0.15       0
 61          UC   0.186   0.227
 62          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 63          UA     100
                 *

 64          KK   CON10 COMBINE
 65          HC       2
                 *

 66          KK    ON05   BASIN
 67          BA  0.0008
 68          LG    0.25    0.40    6.00    0.15       0
 69          UC   0.146   0.236
 70          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 71          UA     100
                 *

 72          KK    ON15   BASIN
 73          BA  0.0006
 74          LG    0.25    0.40    6.00    0.15       0
 75          UC   0.118   0.135
 76          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 77          UA     100
                 *
 78          ZZ

             SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

 NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  19       OFF05
               .
               .
  26           .-------->  DTFF05
  25       DOFF05
               V
               V
  29       ROFF05
               .
               .
  34           .       OFF10
               .          V
               .          V
  40           .      ROFF10
               .          .
               .          .
  45           .          .       OFF15
               .          .          .
               .          .          .
  51       COFF15.........................
               V
               V
  53       ROFF15
               .
               .
  58           .        ON10
               .          .
               .          .
  64        CON10............
               .
               .
  66           .        ON05
```

```
                .          .
                .          .
   72           .          .        ON15

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   11OCT16  TIME  13:16:44   *
*                                       *
*****************************************

*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************

                          City of Scottsdale
                          TROONEX - Villages at Troon Phase 3
                          100 YEAR
                          6 Hour  Storm
                          Unit Hydrograph: Clark
                          Storm: Multiple
                          10/11/2016

   9 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                      NMIN           2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN99  STARTING DATE
                      ITIME        0000  STARTING TIME
                        NQ         2000  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      3JAN99  ENDING DATE
                     NDTIME        1838  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL      .03 HOURS
                      TOTAL TIME BASE   66.63 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

  11 JD          INDEX STORM NO. 1
                      STRM        3.13  PRECIPITATION DEPTH
                      TRDA         .00  TRANSPOSITION DRAINAGE AREA

  12 PI           PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .01       .01       .01
                   .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                   .02       .02       .04       .06       .06       .06       .06       .06       .06       .06
                   .01       .01       .01       .01       .01       .01       .01       .01       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

  15 JD          INDEX STORM NO. 2
                      STRM        3.11  PRECIPITATION DEPTH
                      TRDA         .50  TRANSPOSITION DRAINAGE AREA

  16 PI           PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .01       .01       .01
                   .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
```

.02	.02	.04	.06	.06	.06	.06	.06	.06	.06
.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT	OFF05	39.	4.17	5.	1.	0.	.02		
.	DIVERSION TO	DTFF05	25.	4.17	3.	1.	0.	.02		
	HYDROGRAPH AT	DOFF05	14.	4.17	2.	0.	0.	.02		
+	ROUTED TO	ROFF05	14.	4.17	2.	0.	0.	.02		
	HYDROGRAPH AT	OFF10	22.	4.13	2.	1.	0.	.01		
+	ROUTED TO	ROFF10	22.	4.17	2.	1.	0.	.01		
	HYDROGRAPH AT	OFF15	55.	4.13	5.	1.	0.	.03		
	3 COMBINED AT	COFF15	89.	4.13	9.	2.	1.	.05		
.	ROUTED TO	ROFF15	88.	4.17	9.	2.	1.	.05		
	HYDROGRAPH AT	ON10	9.	4.10	1.	0.	0.	.00		
+	2 COMBINED AT	CON10	96.	4.13	10.	3.	1.	.06		
	HYDROGRAPH AT	ON05	2.	4.07	0.	0.	0.	.00		
+	HYDROGRAPH AT	ON15	2.	4.03	0.	0.	0.	.00		

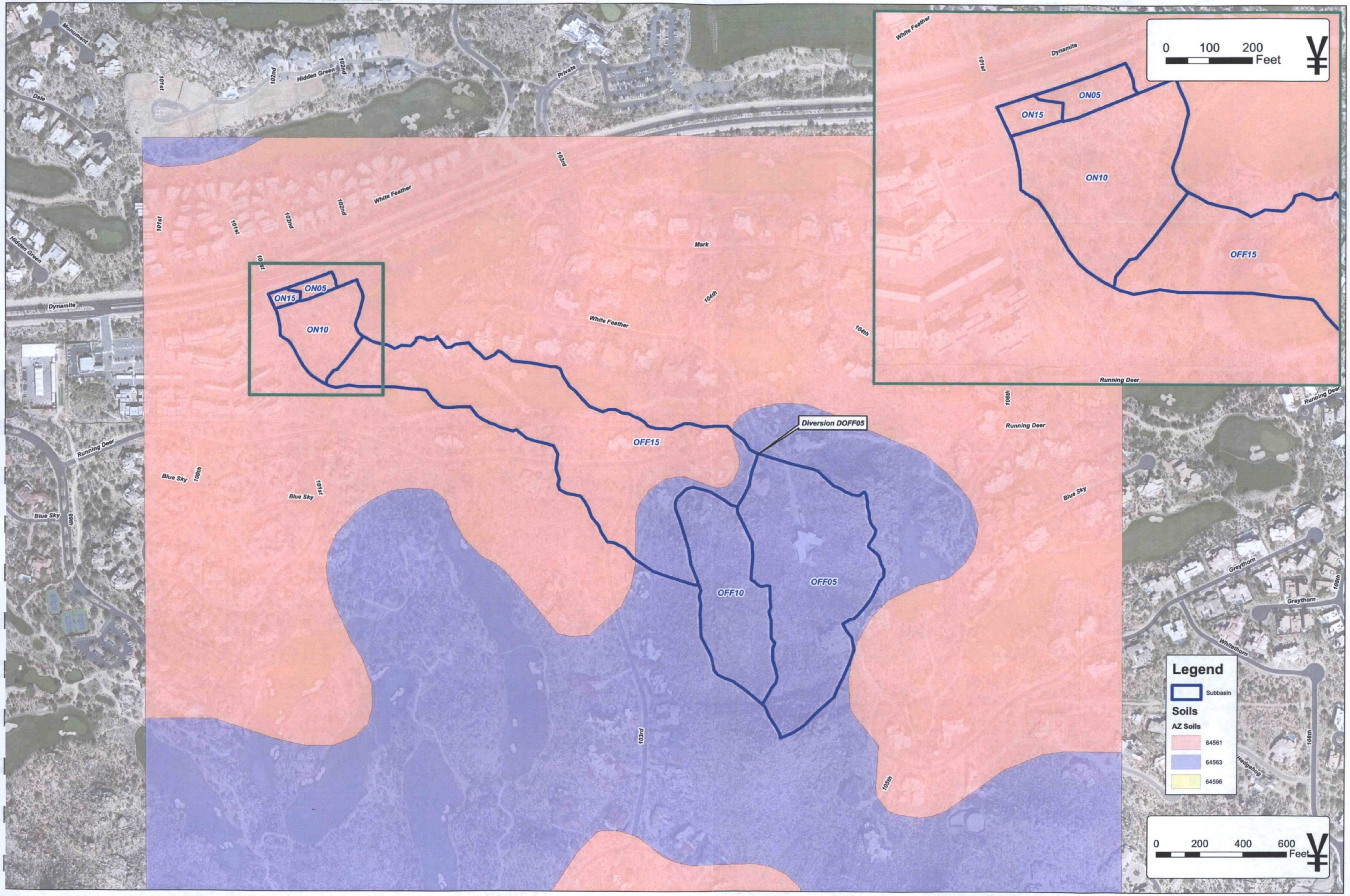
-** NORMAL END OF HEC-1 ***

Appendix B Proposed Conditions Hydrology

- *Proposed Conditions Soils*
- *Proposed Conditions Land Use*
- *Subbasin Parameters*
- *Routing Reaches*
- *HEC-1 Results*

Appendix B Proposed Conditions Hydrology

- *Proposed Conditions Soils*



SCALE(H): 1"= SCALE	SCALE(V): XX
DESIGNED BY: ZRS	DRAWN BY: ZRS
CHECKED BY: XX	DATE: 10/2016

Kimley»Horn

Engineering, Planning and Environmental Consultants
7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

CITY OF SCOTTSDALE
VILLAGES AT TROON PHASE 3
PROPOSED CONDITIONS
SOILS

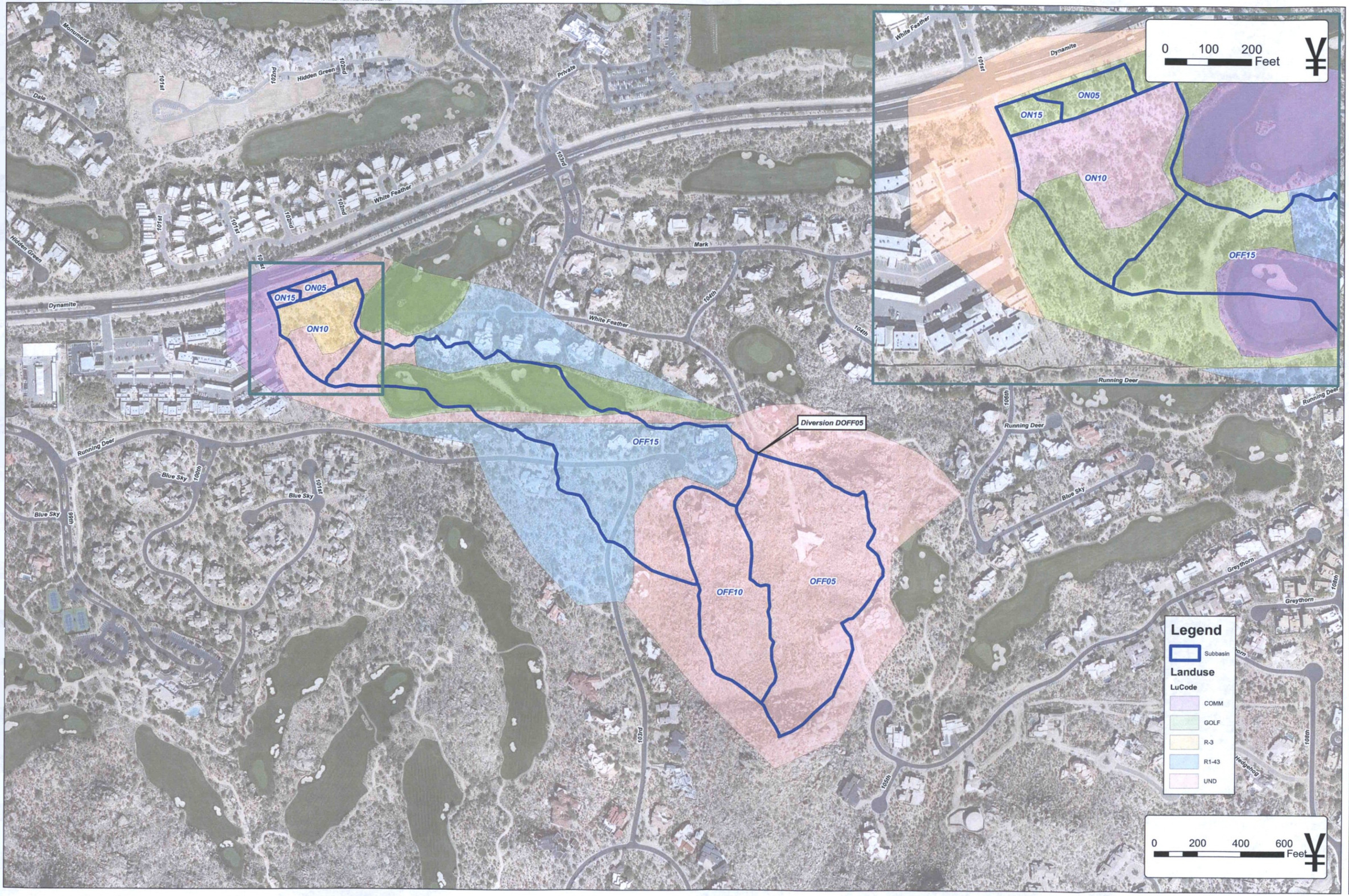
PROJECT NO. XX

DRAWING NAME XX

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
OFF05	645	63	64563	0.019	100.00	0.140	25.00	100	
OFF10	645	63	64563	0.010	100.00	0.140	25.00	100	
OFF15	645	61	64561	0.022	82.80	0.150	-	100	
	645	63	64563	0.005	17.20	0.140	25.00	100	
ON05	645	61	64561	0.001	100.00	0.150	-	100	
ON10	645	61	64561	0.004	100.00	0.150	-	100	
ON15	645	61	64561	0.000	100.00	0.150	-	100	

Appendix B Proposed Conditions Hydrology

- *Proposed Conditions Land Use*



Kimley»Horn
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Engineering, Planning and Environmental Consultants
7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE(H):1"= SCALE(V):	XX
DESIGNED BY:	ZRS
DRAWN BY:	ZRS
CHECKED BY:	XX
DATE:	10/2016

CITY OF SCOTTSDALE
VILLAGES AT TROON PHASE 3
PROPOSED CONDITIONS
LANDUSE

PROJECT NO.
XX

DRAWING NAME
XX

City of Scottsdale
Drainage Design Management System
LAND USE
Project Reference: TROONPR

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb	Description
Major Basin ID: 01									
OFF05	UND	0.0190	100.0	0.25	20 *	0.0	DRY	0.123	Undisturbed natural desert or desert landscaping (no impervi
		0.0190	**100.0**						
OFF10	UND	0.0096	100.0	0.25	20 *	0.0	DRY	0.130	Undisturbed natural desert or desert landscaping (no impervi
		0.0096	**100.0**						
OFF15	GOLF	0.0059	22.6	0.44	0	60.0	NORMAL	0.032	Golf Course
	R1-43	0.0127	48.7	0.30	17	20.0	NORMAL	0.032	Residential 43,000 sq-ft lots
	UND	0.0075	28.7	0.25	20 *	0.0	DRY	0.119	Undisturbed natural desert or desert landscaping (no impervi
		0.0261	**100.0**						
ON05	UND	0.0005	100.0	0.25	0	0.0	DRY	0.155	Undisturbed natural desert or desert landscaping (no impervi
		0.0005	**100.0**						
ON10	R-4	0.0028	66.7	0.25	65	50.0	NORMAL	0.037	Residential Townhouse
	UND	0.0014	33.3	0.25	0	0.0	DRY	0.140	Undisturbed natural desert or desert landscaping (no impervi
		0.0042	**100.0**						
ON15	UND	0.0003	100.0	0.25	0	0.0	DRY	0.155	Undisturbed natural desert or desert landscaping (no impervi
		0.0003	**100.0**						

* Non default value

Appendix B Proposed Conditions Hydrology

- *Subbasin Parameters*

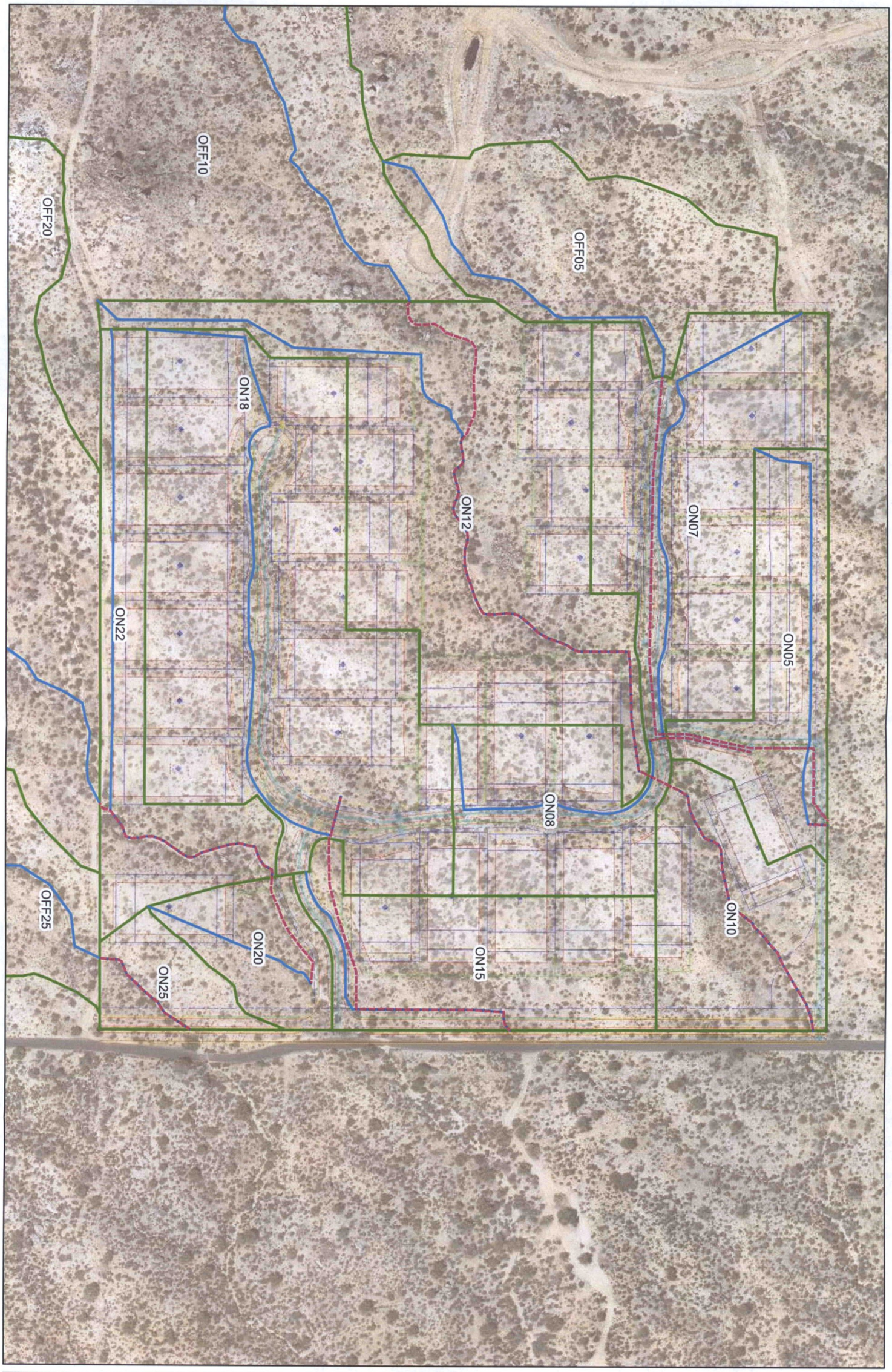
City of Scottsdale
Drainage Design Management System
SUB BASINS
Project Reference: TROONPR

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
OFF05	0.019	0.30	979.7	313.0	NATURAL	0.123	0.25	0.39	6.16	0.140	45	**Tc (Hrs)**	0.353	0.342	0.316	0.288	0.270	0.256
												Vel (f/s)	1.25	1.29	1.39	1.53	1.63	1.72
												R (Hrs)	0.426	0.411	0.376	0.339	0.317	0.298
OFF15	0.026	0.41	431.0	293.7	NATURAL	0.057	0.32	0.29	6.00	0.171	18	**Tc (Hrs)**	0.311	0.299	0.272	0.243	0.225	0.212
												Vel (f/s)	1.93	2.01	2.21	2.47	2.67	2.84
												R (Hrs)	0.397	0.380	0.342	0.301	0.278	0.260
OFF10	0.010	0.21	1009.6	313.0	NATURAL	0.130	0.25	0.39	6.16	0.140	45	**Tc (Hrs)**	0.304	0.295	0.272	0.248	0.233	0.221
												Vel (f/s)	1.01	1.04	1.13	1.24	1.32	1.39
												R (Hrs)	0.391	0.377	0.346	0.311	0.291	0.274
ON05	0.001	0.04	359.0	280.1	NATURAL	0.155	0.25	0.40	6.00	0.150		**Tc (Hrs)**	0.179	0.171	0.153	0.135	0.124	0.116
												Vel (f/s)	0.33	0.34	0.38	0.43	0.47	0.51
												R (Hrs)	0.214	0.204	0.180	0.156	0.142	0.132
ON10	0.004	0.07	253.5	242.0	NATURAL	0.072	0.25	0.30	6.00	0.189	43	**Tc (Hrs)**	0.141	0.137	0.126	0.115	0.108	0.102
												Vel (f/s)	0.73	0.75	0.81	0.89	0.95	1.01
												R (Hrs)	0.117	0.113	0.103	0.093	0.087	0.082
ON15	0.001	0.03	333.3	273.7	NATURAL	0.155	0.25	0.40	6.00	0.150		**Tc (Hrs)**	0.156	0.149	0.134	0.117	0.108	0.101
												Vel (f/s)	0.28	0.30	0.33	0.38	0.41	0.44
												R (Hrs)	0.146	0.139	0.123	0.106	0.097	0.090

* Non default value or value out of range

Appendix B Proposed Conditions Hydrology

- *Routing Reaches*



PROJECT NO. XXX DRAWING NAME XXX		XXX	SCALE(H):1"= SCALE(V): DESIGNED BY: DRAWN BY: CHECKED BY: DATE:	Kimley»Horn Engineering, Planning and Environmental Consultants	 7740 North 16th Street, Suite 300 Phoenix, Arizona 85020 (602) 944-5500	NO.	REVISION	BY	DATE	APPR.

Appendix B Proposed Conditions Hydrology

- *HEC-1 Results*

Diversion ID/ DT Card ID	Maximum Volume (ac-ft)	Maximum Diversion (cfs)		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
DOFF05			**Inflow (cfs)**		100	200	500	1,000	2,000	4,000	10,000	20,000	50,000
DTFF05			**Diversion (cfs)**		65	130	325	650	1,300	2,600	6,500	13,000	32,500

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
ROFF05	0.040	0.040	0.040	2,061.00	0.0460	-	X:	-	3.00	6.00	37.00	45.00	52.00	58.00	65.00
							Y:	2,550.00	2,449.00	2,448.00	2,446.00	2,447.00	2,448.00	2,449.00	2,550.00
ROFF10	0.040	0.040	0.040	1,811.00	0.0460	-	X:	-	3.00	6.00	37.00	45.00	52.00	58.00	65.00
							Y:	2,550.00	2,449.00	2,448.00	2,446.00	2,447.00	2,448.00	2,449.00	2,550.00
ROFF15	0.040	0.040	0.040	371.00	0.0350	-	X:	-	3.00	6.00	12.00	14.00	20.00	23.00	26.00
							Y:	2,532.00	2,531.00	2,530.00	2,528.00	2,528.00	2,530.00	2,531.00	2,532.00

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   30JAN17  TIME  14:09:06   *
*                                       *
*****************************************
```

Proposed 2-year

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X        XXXXX  X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        City of Scottsdale
   2          ID        TROONPR - Villages at Troon Phase 3
   3          ID        2 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        01/30/2017
              *DIAGRAM
   8          IT       2  1JAN99       0    2000
   9          IO       5
  10          IN      15
              *
  11          JD   1.390  0.0001
  12          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  13          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  14          PC   0.962   0.972   0.983   0.991   1.000
  15          JD   1.382  0.5000
  16          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  17          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  18          PC   0.962   0.972   0.983   0.991   1.000
              *

  19          KK   OFF05   BASIN
  20          BA   0.019
  21          LG    0.25    0.39    6.16    0.14      45
  22          UC   0.353   0.426
  23          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  24          UA     100
              *

  25          KK  DOFF05  DIVERT
  26          DT  DTFF05     0.0     0.0
  27          DI     0.0   100.0   200.0   500.0  1000.0  2000.0  4000.0 10000.0 20000.0 50000.0
  28          DQ     0.0    65.0   130.0   325.0   650.0  1300.0  2600.0  6500.0 13000.0 32500.0
              *

  29          KK  ROFF05   ROUTE
  30          RS       1    FLOW
  31          RC   0.040   0.040   0.040    2061  0.0460    0.00
  32          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
  33          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
              *

  34          KK   OFF10   BASIN
  35          BA   0.010
  36          LG    0.25    0.39    6.16    0.14      45
  37          UC   0.304   0.391
  38          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  39          UA     100
              *
```

HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
```

```
40          KK  ROFF10   ROUTE
41          RS       1    FLOW
42          RC   0.040   0.040   0.040    1811  0.0460    0.00
43          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
44          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
                *

45          KK   OFF15   BASIN
46          BA   0.026
47          LG    0.32    0.29    6.00    0.17      18
48          UC   0.311   0.397
49          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
50          UA     100
                *

51          KK  COFF15 COMBINE
52          HC       3
                *

53          KK  ROFF15   ROUTE
54          RS       1    FLOW
55          RC   0.040   0.040   0.040     371  0.0350    0.00
56          RX    0.00    3.00    6.00   12.00   14.00   20.00   23.00   26.00
57          RY  2532.0 2531.00 2530.00 2528.00 2528.00 2530.00 2531.00 2532.00
                *

58          KK    ON10   BASIN
59          BA   0.004
60          LG    0.25    0.30    6.00    0.19      43
61          UC   0.141   0.117
62          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
63          UA     100
                *

64          KK   CON10 COMBINE
65          HC       2
                *

66          KK    ON05   BASIN
67          BA  0.0005
68          LG    0.25    0.40    6.00    0.15       0
69          UC   0.179   0.214
70          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
71          UA     100
                *

72          KK    ON15   BASIN
73          BA  0.0003
74          LG    0.25    0.40    6.00    0.15       0
75          UC   0.156   0.146
76          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
77          UA     100
                *
78          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

 NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  19       OFF05
               .
               .
  26           .-------->  DTFF05
  25       DOFF05
               V
               V
  29       ROFF05
               .
               .
  34           .       OFF10
               .          V
               .          V
  40           .      ROFF10
               .          .
               .          .
  45           .          .       OFF15
               .          .          .
               .          .          .
  51       COFF15.........................
               V
               V
  53       ROFF15
               .
               .
  58           .        ON10
               .          .
               .          .
  64        CON10............
               .
               .
  66           .        ON05
```

```
                .          .
                .          .
   72           .          .        ON15

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                    ****************************************
 *                                       *                   *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                   *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN  1998                *                   *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1                *                   *         609 SECOND STREET            *
 *                                       *                   *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   30JAN17  TIME  14:09:06   *                   *          (916) 756-1104              *
 *                                       *                   *                                      *
 *****************************************                   ****************************************

                              City of Scottsdale
                              TROONPR - Villages at Troon Phase 3
                              2 YEAR
                              6 Hour  Storm
                              Unit Hydrograph: Clark
                              Storm: Multiple
                              01/30/2017

   9 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                      NMIN           2  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1JAN99  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      3JAN99  ENDING DATE
                    NDTIME        1838  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .03 HOURS
                      TOTAL TIME BASE    66.63 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

  11 JD          INDEX STORM NO. 1
                      STRM        1.39  PRECIPITATION DEPTH
                      TRDA         .00  TRANSPOSITION DRAINAGE AREA

  12 PI            PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .01       .01       .01
                   .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                   .02       .02       .04       .06       .06       .06       .06       .06       .06       .06
                   .01       .01       .01       .01       .01       .01       .01       .01       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

  15 JD          INDEX STORM NO. 2
                      STRM        1.38  PRECIPITATION DEPTH
                      TRDA         .50  TRANSPOSITION DRAINAGE AREA

  16 PI            PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .01       .01       .01
                   .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
```

.02	.02	.04	.06	.06	.06	.06	.06	.06	.06
.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT	OFF05	11.	4.23	2.	0.	0.	.02		
	DIVERSION TO	DTFF05	7.	4.23	1.	0.	0.	.02		
	HYDROGRAPH AT	DOFF05	4.	4.23	1.	0.	0.	.02		
+	ROUTED TO	ROFF05	4.	4.27	1.	0.	0.	.02		
	HYDROGRAPH AT	OFF10	6.	4.20	1.	0.	0.	.01		
+	ROUTED TO	ROFF10	6.	4.23	1.	0.	0.	.01		
	HYDROGRAPH AT	OFF15	12.	4.20	2.	0.	0.	.03		
	3 COMBINED AT	COFF15	22.	4.23	3.	1.	0.	.05		
	ROUTED TO	ROFF15	22.	4.23	3.	1.	0.	.05		
	HYDROGRAPH AT	ON10	4.	4.07	0.	0.	0.	.00		
+	2 COMBINED AT	CON10	24.	4.23	3.	1.	0.	.06		
	HYDROGRAPH AT	ON05	0.	4.10	0.	0.	0.	.00		
+	HYDROGRAPH AT	ON15	0.	4.07	0.	0.	0.	.00		

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   11OCT16  TIME  13:16:56   *
*                                       *
*****************************************
```

Proposed 10-year

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X       XXXXX  X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID        City of Scottsdale
   2          ID        TROONPR - Villages at Troon Phase 3
   3          ID        10 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        10/11/2016
              *DIAGRAM
   8          IT       2  1JAN99       0    2000
   9          IO       5
  10          IN      15
              *
  11          JD   2.062  0.0001
  12          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  13          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  14          PC   0.962   0.972   0.983   0.991   1.000
  15          JD   2.050  0.5000
  16          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  17          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  18          PC   0.962   0.972   0.983   0.991   1.000
              *

  19          KK   OFF05   BASIN
  20          BA   0.019
  21          LG    0.25    0.39    6.16    0.14      45
  22          UC   0.316   0.376
  23          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  24          UA     100
              *

  25          KK  DOFF05  DIVERT
  26          DT  DTFF05     0.0     0.0
  27          DI     0.0   100.0   200.0   500.0  1000.0  2000.0  4000.0 10000.0 20000.0 50000.0
  28          DQ     0.0    65.0   130.0   325.0   650.0  1300.0  2600.0  6500.0 13000.0 32500.0
              *

  29          KK  ROFF05   ROUTE
  30          RS       3    FLOW
  31          RC   0.040   0.040   0.040    2061  0.0460    0.00
  32          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
  33          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
              *

  34          KK   OFF10   BASIN
  35          BA   0.010
  36          LG    0.25    0.39    6.16    0.14      45
  37          UC   0.272   0.346
  38          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  39          UA     100
              *
```

HEC-1 INPUT PAGE 2

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
 40          KK  ROFF10   ROUTE
 41          RS       3    FLOW
 42          RC   0.040   0.040   0.040    1811  0.0460    0.00
 43          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
 44          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
             *

 45          KK   OFF15   BASIN
 46          BA   0.026
 47          LG    0.32    0.29    6.00    0.17      18
 48          UC   0.272   0.342
 49          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 50          UA     100
             *

 51          KK  COFF15 COMBINE
 52          HC       3
             *

 53          KK  ROFF15   ROUTE
 54          RS       1    FLOW
 55          RC   0.040   0.040   0.040     371  0.0350    0.00
 56          RX    0.00    3.00    6.00   12.00   14.00   20.00   23.00   26.00
 57          RY  2532.0 2531.00 2530.00 2528.00 2528.00 2530.00 2531.00 2532.00
             *

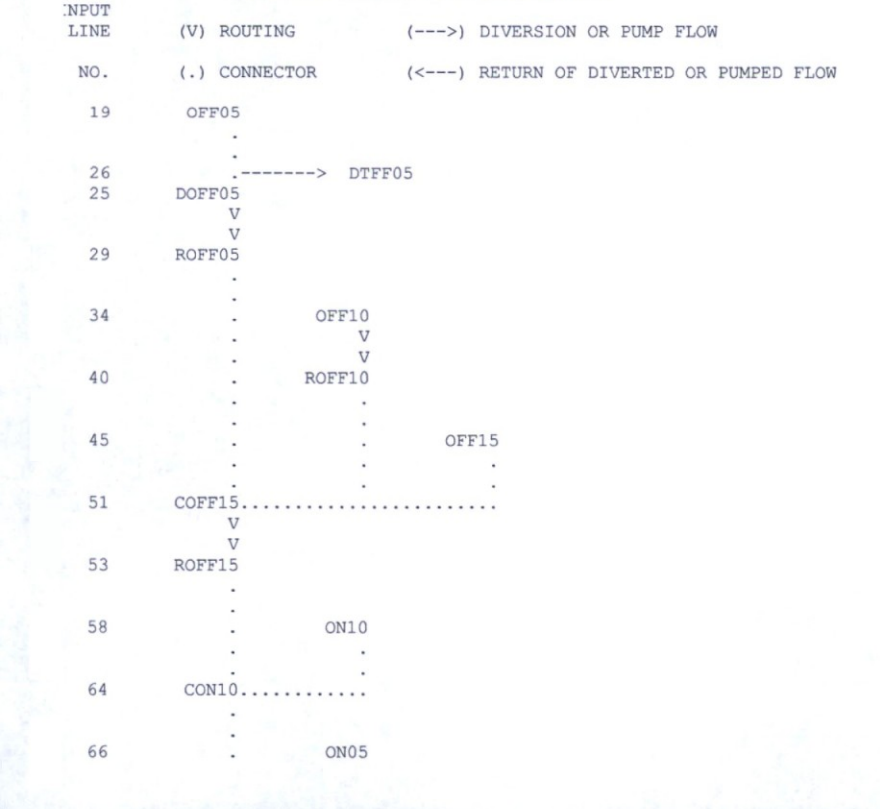
 58          KK    ON10   BASIN
 59          BA   0.004
 60          LG    0.25    0.30    6.00    0.19      43
 61          UC   0.126   0.103
 62          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 63          UA     100
             *

 64          KK   CON10 COMBINE
 65          HC       2
             *

 66          KK    ON05   BASIN
 67          BA  0.0005
 68          LG    0.25    0.40    6.00    0.15       0
 69          UC   0.153   0.180
 70          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 71          UA     100
             *

 72          KK    ON15   BASIN
 73          BA  0.0003
 74          LG    0.25    0.40    6.00    0.15       0
 75          UC   0.134   0.123
 76          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 77          UA     100
             *
 78          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



```
                .          .
                .          .
   72           .          .        ON15

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   11OCT16  TIME  13:16:56   *
*                                       *
*****************************************

*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************

                          City of Scottsdale
                          TROONPR - Villages at Troon Phase 3
                          10 YEAR
                          6 Hour  Storm
                          Unit Hydrograph: Clark
                          Storm: Multiple
                          10/11/2016

   9 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN          2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN99  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      3JAN99  ENDING DATE
                     NDTIME        1838  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .03 HOURS
                      TOTAL TIME BASE   66.63 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

  11 JD          INDEX STORM NO. 1
                       STRM       2.06  PRECIPITATION DEPTH
                       TRDA        .00  TRANSPOSITION DRAINAGE AREA

  12 PI            PRECIPITATION PATTERN
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .01   .01   .01
                   .01   .01   .01   .01   .01   .02   .02   .02   .02   .02
                   .02   .02   .04   .06   .06   .06   .06   .06   .06   .06
                   .01   .01   .01   .01   .01   .01   .01   .01   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00

  15 JD          INDEX STORM NO. 2
                       STRM       2.05  PRECIPITATION DEPTH
                       TRDA        .50  TRANSPOSITION DRAINAGE AREA

  16 PI            PRECIPITATION PATTERN
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00
                   .00   .00   .00   .00   .00   .00   .00   .01   .01   .01
                   .01   .01   .01   .01   .01   .02   .02   .02   .02   .02
```

.02	.02	.04	.06	.06	.06	.06	.06	.06	.06
.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT	OFF05	21.	4.20	3.	1.	0.	.02		
.	DIVERSION TO	DTFF05	13.	4.20	2.	0.	0.	.02		
	HYDROGRAPH AT	DOFF05	7.	4.20	1.	0.	0.	.02		
+	ROUTED TO	ROFF05	7.	4.23	1.	0.	0.	.02		
	HYDROGRAPH AT	OFF10	11.	4.17	1.	0.	0.	.01		
+	ROUTED TO	ROFF10	11.	4.20	1.	0.	0.	.01		
	HYDROGRAPH AT	OFF15	26.	4.17	3.	1.	0.	.03		
	3 COMBINED AT	COFF15	44.	4.20	5.	1.	0.	.05		
.	ROUTED TO	ROFF15	44.	4.20	5.	1.	0.	.05		
	HYDROGRAPH AT	ON10	8.	4.03	1.	0.	0.	.00		
+	2 COMBINED AT	CON10	47.	4.20	6.	1.	1.	.06		
	HYDROGRAPH AT	ON05	1.	4.07	0.	0.	0.	.00		
+	HYDROGRAPH AT	ON15	0.	4.07	0.	0.	0.	.00		

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   11OCT16  TIME  13:17:03   *
*                                       *
*****************************************
```

Proposed 100-year

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        City of Scottsdale
   2          ID        TROONPR - Villages at Troon Phase 3
   3          ID        100 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        10/11/2016
              *DIAGRAM
   8          IT       2  1JAN99       0    2000
   9          IO       5
  10          IN      15
              *
  11          JD   3.130  0.0001
  12          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  13          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  14          PC   0.962   0.972   0.983   0.991   1.000
  15          JD   3.111  0.5000
  16          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  17          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  18          PC   0.962   0.972   0.983   0.991   1.000
              *

  19          KK   OFF05   BASIN
  20          BA   0.019
  21          LG    0.25    0.39    6.16    0.14      45
  22          UC   0.256   0.298
  23          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  24          UA     100
              *

  25          KK  DOFF05  DIVERT
  26          DT  DTFF05     0.0     0.0
  27          DI     0.0   100.0   200.0   500.0  1000.0  2000.0  4000.0 10000.0 20000.0 50000.0
  28          DQ     0.0    65.0   130.0   325.0   650.0  1300.0  2600.0  6500.0 13000.0 32500.0
              *

  29          KK  ROFF05   ROUTE
  30          RS       3    FLOW
  31          RC   0.040   0.040   0.040    2061  0.0460    0.00
  32          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
  33          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
              *

  34          KK   OFF10   BASIN
  35          BA   0.010
  36          LG    0.25    0.39    6.16    0.14      45
  37          UC   0.221   0.274
  38          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  39          UA     100
              *
```

HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
```

```
 40          KK  ROFF10   ROUTE
 41          RS       3    FLOW
 42          RC   0.040   0.040   0.040    1811  0.0460    0.00
 43          RX    0.00    3.00    6.00   37.00   45.00   52.00   58.00   65.00
 44          RY  2550.0 2449.00 2448.00 2446.00 2447.00 2448.00 2449.00 2550.00
             *

 45          KK   OFF15   BASIN
 46          BA   0.026
 47          LG    0.32    0.29    6.00    0.17      18
 48          UC   0.212   0.260
 49          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 50          UA     100
             *

 51          KK  COFF15 COMBINE
 52          HC       3
             *

 53          KK  ROFF15   ROUTE
 54          RS       1    FLOW
 55          RC   0.040   0.040   0.040     371  0.0350    0.00
 56          RX    0.00    3.00    6.00   12.00   14.00   20.00   23.00   26.00
 57          RY  2532.0 2531.00 2530.00 2528.00 2528.00 2530.00 2531.00 2532.00
             *

 58          KK    ON10   BASIN
 59          BA   0.004
 60          LG    0.25    0.30    6.00    0.19      43
 61          UC   0.102   0.082
 62          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 63          UA     100
             *

 64          KK   CON10 COMBINE
 65          HC       2
             *

 66          KK    ON05   BASIN
 67          BA  0.0005
 68          LG    0.25    0.40    6.00    0.15       0
 69          UC   0.116   0.132
 70          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 71          UA     100
             *

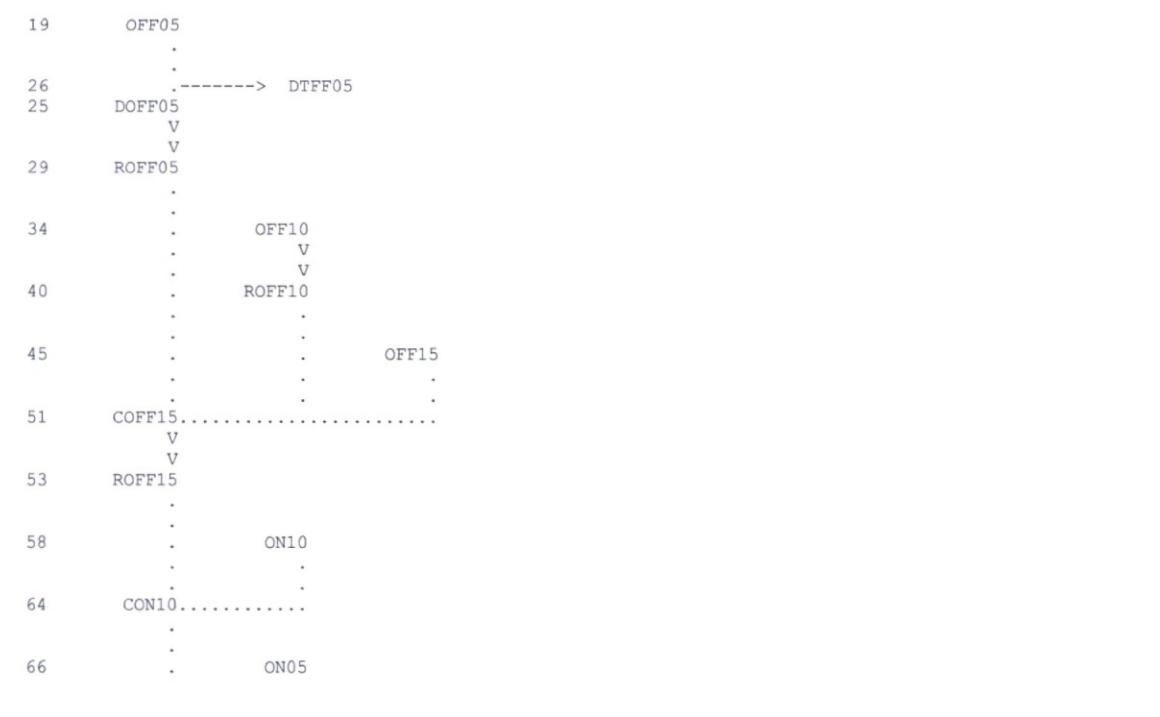
 72          KK    ON15   BASIN
 73          BA  0.0003
 74          LG    0.25    0.40    6.00    0.15       0
 75          UC   0.101   0.090
 76          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 77          UA     100
             *
 78          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW



```
                .          .
                .          .
   72           .          .        ON15

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   11OCT16  TIME  13:17:03   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

City of Scottsdale
TROONPR - Villages at Troon Phase 3
100 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
10/11/2016

```
   9 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT           HYDROGRAPH TIME DATA
                       NMIN           2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN99  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      3JAN99  ENDING DATE
                     NDTIME        1838  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .03 HOURS
                      TOTAL TIME BASE   66.63 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

  11 JD          INDEX STORM NO. 1
                       STRM        3.13  PRECIPITATION DEPTH
                       TRDA         .00  TRANSPOSITION DRAINAGE AREA

  12 PI            PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .01       .01       .01
                   .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                   .02       .02       .04       .06       .06       .06       .06       .06       .06       .06
                   .01       .01       .01       .01       .01       .01       .01       .01       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

  15 JD          INDEX STORM NO. 2
                       STRM        3.11  PRECIPITATION DEPTH
                       TRDA         .50  TRANSPOSITION DRAINAGE AREA

  16 PI            PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .01       .01       .01
                   .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
```

.02	.02	.04	.06	.06	.06	.06	.06	.06	.06
.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT	OFF05	39.	4.17	5.	1.	0.	.02		
	DIVERSION TO	DTFF05	25.	4.17	3.	1.	0.	.02		
	HYDROGRAPH AT	DOFF05	14.	4.17	2.	0.	0.	.02		
	ROUTED TO	ROFF05	14.	4.17	2.	0.	0.	.02		
	HYDROGRAPH AT	OFF10	22.	4.13	2.	1.	0.	.01		
	ROUTED TO	ROFF10	22.	4.17	2.	1.	0.	.01		
	HYDROGRAPH AT	OFF15	55.	4.13	5.	1.	0.	.03		
	3 COMBINED AT	COFF15	89.	4.13	9.	2.	1.	.05		
	ROUTED TO	ROFF15	88.	4.13	9.	2.	1.	.05		
	HYDROGRAPH AT	ON10	13.	4.03	1.	0.	0.	.00		
	2 COMBINED AT	CON10	95.	4.13	10.	3.	1.	.06		
	HYDROGRAPH AT	ON05	1.	4.03	0.	0.	0.	.00		
	HYDROGRAPH AT	ON15	1.	4.03	0.	0.	0.	.00		

*** NORMAL END OF HEC-1 ***

Appendix C Stormwater Waiver

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ___ ____ - PP - ____ PC#_____

The applicant/developer must complete and submit this form to the city for processing and obtain approval of waiver request ***before submitting improvement plans***. Denial of the waiver may require the developer to submit a revised site plan to the Development Review Board.

Date 10/31/2016 **Project Name** Troon Village Phase 3

Project Location SEC of 122nd Street and Dynamite Blvd

Applicant Contact Jason Burm, PE **Company Name** Kimley-Horn and Associates

Phone 480-207-2666 Fax _____ E-mail jason.burm@kimley-horn.com

Address 1855 W Baseline Rd, Suite 200, Mesa AZ, 85202

Waiver Criteria

A project must meet at least one of three criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

☐ 1. The development is adjacent to a conveyance facility that an engineering analysis shows is designed and constructed to handle the additional runoff from the site as a result of development.

☐ 2. The development is on a parcel less than one-half acre in size.

☑ 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO).

For a full storage waiver, a conflict with ESLO is limited to:

- Property located in the hillside landform as defined in the city Zoning Ordinance
- Property in the upper desert landform that has a land slope steeper than 5% as defined in the city Zoning Ordinance
- Property within the ESL zoning overlay district where the only viable location for a stormwater storage basin requires blasting

This full waiver only applies to those portions of property meeting one of these three requirements.

Partial waivers are available for projects or portions of properties within the Environmentally Sensitive Lands Zoning Overlay District, not meeting any of the three full waiver criteria above, if post-development peak discharge rates do not exceed pre-development conditions, based on the 10- and 100-year storm events.

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

_____ 11.1.16

Engineer Date

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7781

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ___ ____ - PP - ____ PC#_____

CITY STAFF TO COMPLETE THIS PAGE

Project Name _____

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐ 1 ☐ 2 ☐ 3

☐ Recommend approve waiver.

☐ Recommend deny waiver:
- ☐ None of waiver criteria met.
- ☐ Downstream conditions prohibit waiver of any storage.
- ☐ Other:

Explain: _____
_____

☐ Return waiver request:
- ☐ Insufficient data provided.
- ☐ Other: _____

Explain: _____
_____

Recommended Conditions of Waiver:
- ☐ All storage requirements waived.
- ☐ Post-development peak discharge rates do not exceed pre-development conditions.
- ☐ Other:

Explain: _____
_____

☐ **Waiver approved per above conditions.**

☐ **Waiver denied.**

_____ _____

Floodplain Administrator or Designee Date

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 ◆ Phone: 480-312-2500 ◆ Fax: 480-312-7781

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ___ ____ - PP - ____ PC#_____

In-Lieu Fee and In-Kind Contributions

In-lieu fees are only applicable to projects where post-development peak discharge rates exceed pre-development levels, based on the 10- and 100-year storm events. If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide a storage basin, sized as described below, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $1.87 per cubic foot of stormwater storage for a virtual storage basin designed to mitigate the increase in runoff associated with the 100-year/2-hour storm event. The applicant may submit site-specific in-lieu fee calculations subject to the Floodplain Administrator's approval.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name _____

The waived stormwater storage volume is calculated using a simplified approach as follows:

$V = \Delta CRA$; where

V = stormwater storage volume required, in cubic feet,
ΔC = increase in weighted average runoff coefficient over disturbed area ($C_{post} - C_{pre}$),
R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and
A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where
V_w = volume waived,
V = volume required, and
V_p = volume provided

R = _____
ΔC= _____
A = _____
V = _____
V_p= _____
V_w= _____

☐ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $1.87 per cubic foot = _____

☐ An in-kind contribution will be made, as follows:

_____
_____
_____

☐ No in-lieu fee is required. Reason:

_____
_____

Approved by:

_____ _____
Floodplain Administrator or Designee Date

Planning, Neighborhood & Transportation Division
7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 ◆ Phone: 480-312-2500 ◆ Fax: 480-312-7781

Appendix D Proposed Hydraulics

- *Onsite Wash Normal Depth Analysis*
- *Offsite Outfall Normal Depth Analysis*
- *Scour Depth*
- *Street Capacity*

Appendix D Proposed Hydraulics

- *Onsite Wash Normal Depth Analysis*

XS 1- Existing

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00580	ft/ft
Discharge	89.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	2544.00
0+12	2542.00
0+29	2538.99
0+39	2538.00
0+60	2536.89
0+75	2535.96
0+81	2534.98
0+85	2536.00
0+91	2536.10
1+04	2536.00
1+10	2536.37
1+28	2536.53
1+39	2536.59
1+54	2537.04
1+84	2543.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2544.00)	(1+84, 2543.00)	0.035

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

XS 1- Existing

Results

Normal Depth		1.77	ft
Elevation Range	2534.98 to 2544.00 ft		
Flow Area		42.70	ft²
Wetted Perimeter		82.53	ft
Hydraulic Radius		0.52	ft
Top Width		82.28	ft
Normal Depth		1.77	ft
Critical Depth		1.53	ft
Critical Slope		0.02412	ft/ft
Velocity		2.08	ft/s
Velocity Head		0.07	ft
Specific Energy		1.84	ft
Froude Number		0.51	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.77	ft
Critical Depth	1.53	ft
Channel Slope	0.00580	ft/ft
Critical Slope	0.02412	ft/ft

XS 2- Proposed

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Discharge	89.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+04	2539.64
0+05	2538.02
0+10	2533.83
0+16	2531.83
0+18	2531.83
0+24	2533.83
0+26	2534.25
0+32	2535.49
0+43	2537.84

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+04, 2539.64)	(0+10, 2533.83)	0.069
(0+10, 2533.83)	(0+16, 2531.83)	0.069
(0+16, 2531.83)	(0+18, 2531.83)	0.069
(0+18, 2531.83)	(0+24, 2533.83)	0.069
(0+24, 2533.83)	(0+26, 2534.25)	0.069
(0+26, 2534.25)	(0+43, 2537.84)	0.035

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

XS 2- Proposed

Results

Normal Depth		2.14	ft
Elevation Range	2531.83 to 2539.64 ft		
Flow Area		18.45	ft²
Wetted Perimeter		15.57	ft
Hydraulic Radius		1.19	ft
Top Width		14.83	ft
Normal Depth		2.14	ft
Critical Depth		1.88	ft
Critical Slope		0.07119	ft/ft
Velocity		4.82	ft/s
Velocity Head		0.36	ft
Specific Energy		2.50	ft
Froude Number		0.76	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.14	ft
Critical Depth	1.88	ft
Channel Slope	0.04000	ft/ft
Critical Slope	0.07119	ft/ft

XS 3- Proposed

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Discharge	89.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+08	2533.13
0+09	2532.00
0+11	2530.51
0+17	2528.51
0+19	2528.51
0+20	2528.89
0+25	2530.50
0+31	2530.88
0+33	2531.00
0+34	2538.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+08, 2533.13)	(0+33, 2531.00)	0.069
(0+33, 2531.00)	(0+34, 2538.00)	0.035

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	2.26	ft
Elevation Range	2528.51 to 2538.00 ft	

XS 3- Proposed

Results

Flow Area		20.12	ft²
Wetted Perimeter		19.33	ft
Hydraulic Radius		1.04	ft
Top Width		18.59	ft
Normal Depth		2.26	ft
Critical Depth		1.93	ft
Critical Slope		0.07140	ft/ft
Velocity		4.42	ft/s
Velocity Head		0.30	ft
Specific Energy		2.56	ft
Froude Number		0.75	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.26	ft
Critical Depth	1.93	ft
Channel Slope	0.04000	ft/ft
Critical Slope	0.07140	ft/ft

XS 4- Proposed

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.07000	ft/ft
Discharge	95.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+17	2519.62
0+19	2517.95
0+20	2517.63
0+26	2516.00
0+28	2516.00
0+34	2518.00
0+36	2518.26

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+17, 2519.62)	(0+19, 2517.95)	0.069
(0+19, 2517.95)	(0+26, 2516.00)	0.069
(0+26, 2516.00)	(0+28, 2516.00)	0.069
(0+28, 2516.00)	(0+36, 2518.26)	0.069

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	1.92	ft
Elevation Range	2516.00 to 2519.62 ft	
Flow Area	16.07	ft²

XS 4- Proposed

Results

Wetted Perimeter		15.22	ft
Hydraulic Radius		1.06	ft
Top Width		14.64	ft
Normal Depth		1.92	ft
Critical Depth		1.91	ft
Critical Slope		0.07084	ft/ft
Velocity		5.91	ft/s
Velocity Head		0.54	ft
Specific Energy		2.46	ft
Froude Number		0.99	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.92	ft
Critical Depth	1.91	ft
Channel Slope	0.07000	ft/ft
Critical Slope	0.07084	ft/ft

Appendix D Proposed Hydraulics

- *Offsite Outfall Normal Depth Analysis*

XS 5- Golf Course Outfall

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.05000	ft/ft
Discharge	77.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+14	2533.54
0+35	2531.00
0+39	2530.85
0+46	2531.56
0+54	2532.00
0+62	2533.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+14, 2533.54)	(0+62, 2533.00)	0.035

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	1.02	ft
Elevation Range	2530.85 to 2533.54 ft	
Flow Area	12.53	ft²
Wetted Perimeter	24.03	ft
Hydraulic Radius	0.52	ft
Top Width	23.93	ft
Normal Depth	1.02	ft

XS 5- Golf Course Outfall

Results

Critical Depth		1.21	ft
Critical Slope		0.02112	ft/ft
Velocity		6.15	ft/s
Velocity Head		0.59	ft
Specific Energy		1.61	ft
Froude Number		1.50	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth		0.00	ft
Length		0.00	ft
Number Of Steps		0	

GVF Output Data

Upstream Depth		0.00	ft
Profile Description			
Profile Headloss		0.00	ft
Downstream Velocity		Infinity	ft/s
Upstream Velocity		Infinity	ft/s
Normal Depth		1.02	ft
Critical Depth		1.21	ft
Channel Slope		0.05000	ft/ft
Critical Slope		0.02112	ft/ft

Appendix D Proposed Hydraulics

- *Scour Depth*

Major Basin: 01

ID: XS 2

Type	Calc (ft)	FS	Value (ft)	Method
Long Term	.30	1.30	.39	State Standard Level I
General	.49	1.30	.64	Lacey
Local		1.30		
Bedform		1.30		Comments
Low Flow	1.00	1.00*	1.00	
Total			**2.03**	

ID: XS 3

Type	Calc (ft)	FS	Value (ft)	Method
Long Term	.30	1.30	.39	State Standard Level I
General	1.46	1.30	1.90	Lacey
Local		1.30		
Bedform		1.30		Comments
Low Flow	1.00	1.00*	1.00	
Total			**3.29**	

ID: XS 4

Type	Calc (ft)	FS	Value (ft)	Method
Long Term	.31	1.30	.40	State Standard Level I
General	.50	1.30	.65	Lacey
Local		1.30		
Bedform		1.30		Comments
Low Flow	1.00	1.00*	1.00	
Total			**2.05**	

ID: XS 5

Type	Calc (ft)	FS	Value (ft)	Method
Long Term	.27	1.30	.35	State Standard Level I
General	.47	1.30	.61	Lacey
Local		1.30		
Bedform		1.30		Comments
Low Flow	1.00	1.00*	1.00	
Total			**1.96**	

ID	Q100	Scour Depth (ft)
Maior Basin ID: 01		
XS 2	89	0.30
XS 3	89	0.30
XS 4	95	0.31
XS 5	77	0.27

	Design FlowRate (cfs)	D50 (mm)	Bend Factor, Z	Scour Depth Including Bend (ft)
Maior Basin ID: 01				
ID: XS 2			**Cross Section ID: Manual**	
	89	0.500	0.25	0.49
ID: XS 3			**Cross Section ID: Manual**	
	89	0.500	0.75	1.46
ID: XS 4			**Cross Section ID: Manual**	
	95	0.500	0.25	0.50
ID: XS 5			**Cross Section ID: Manual**	
	77	0.500	0.25	0.47

Appendix D Proposed Hydraulics

- *Street Capacity*

XS 6- Street Capacity- 10-year

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00500	ft/ft
Discharge	8.00	ft^3/s
Gutter Width	1.42	ft
Gutter Cross Slope	0.04	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.015	

Results

Spread	17.39	ft
Flow Area	3.05	ft^2
Depth	0.38	ft
Gutter Depression	0.03	ft
Velocity	2.63	ft/s

XS 6- Street Capacity- 100-year

Project Description

Solve For	Spread

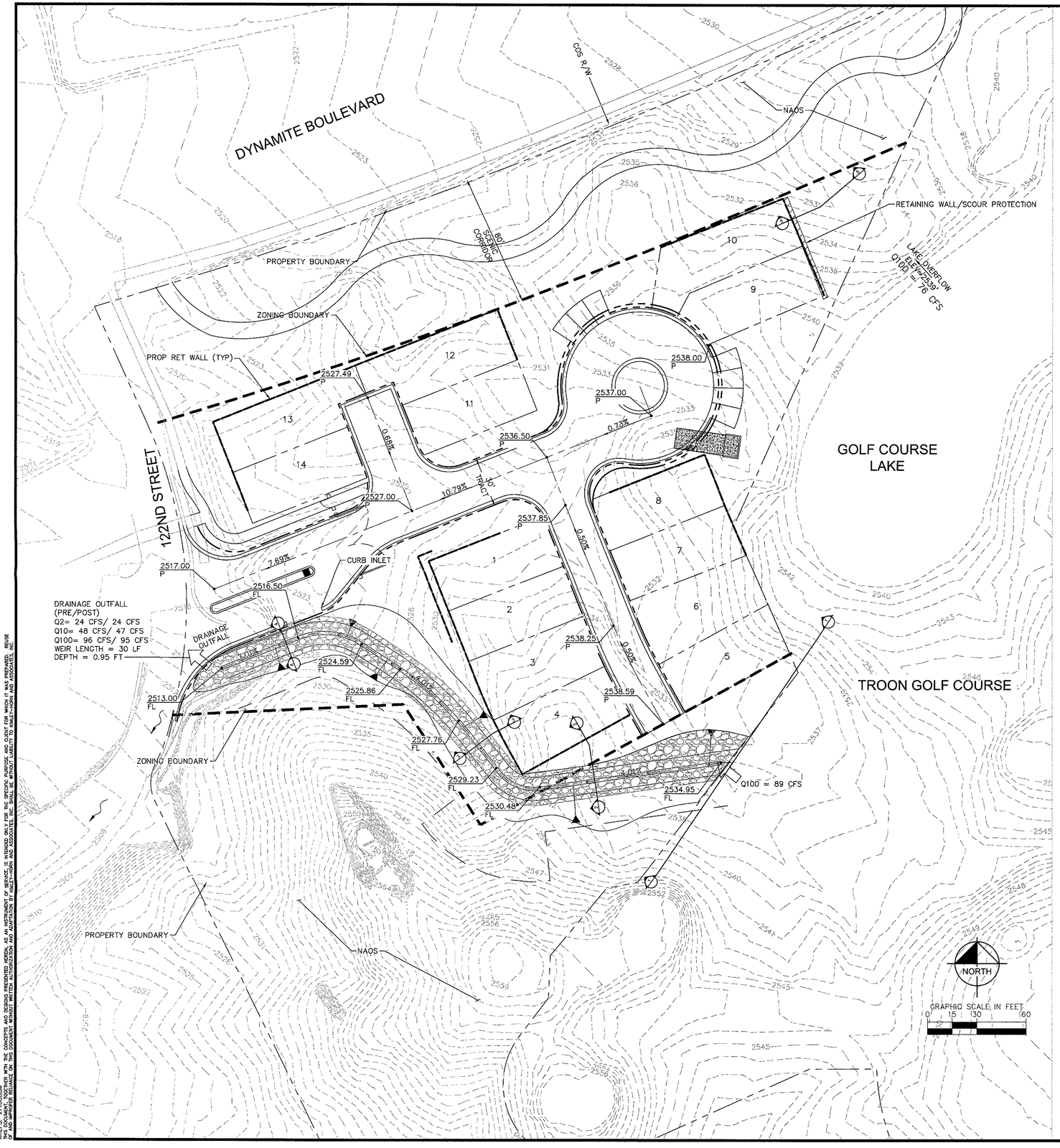
Input Data

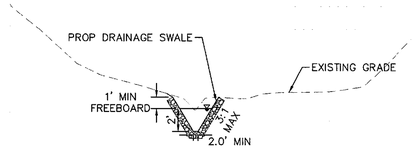
Channel Slope	0.00500	ft/ft
Discharge	13.00	ft^3/s
Gutter Width	1.42	ft
Gutter Cross Slope	0.04	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.015	

Results

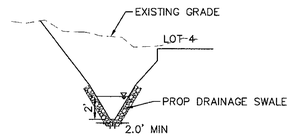
Spread	20.90	ft
Flow Area	4.39	ft^2
Depth	0.45	ft
Gutter Depression	0.03	ft
Velocity	2.96	ft/s

Appendix E Grading and Drainage Plan





SECTION 1
NTS



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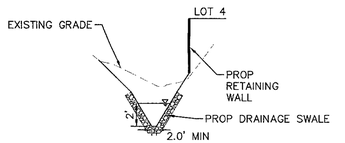

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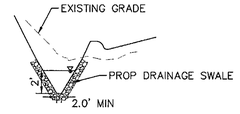

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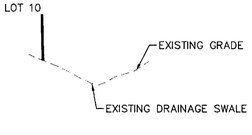


SECTION 5
NTS

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

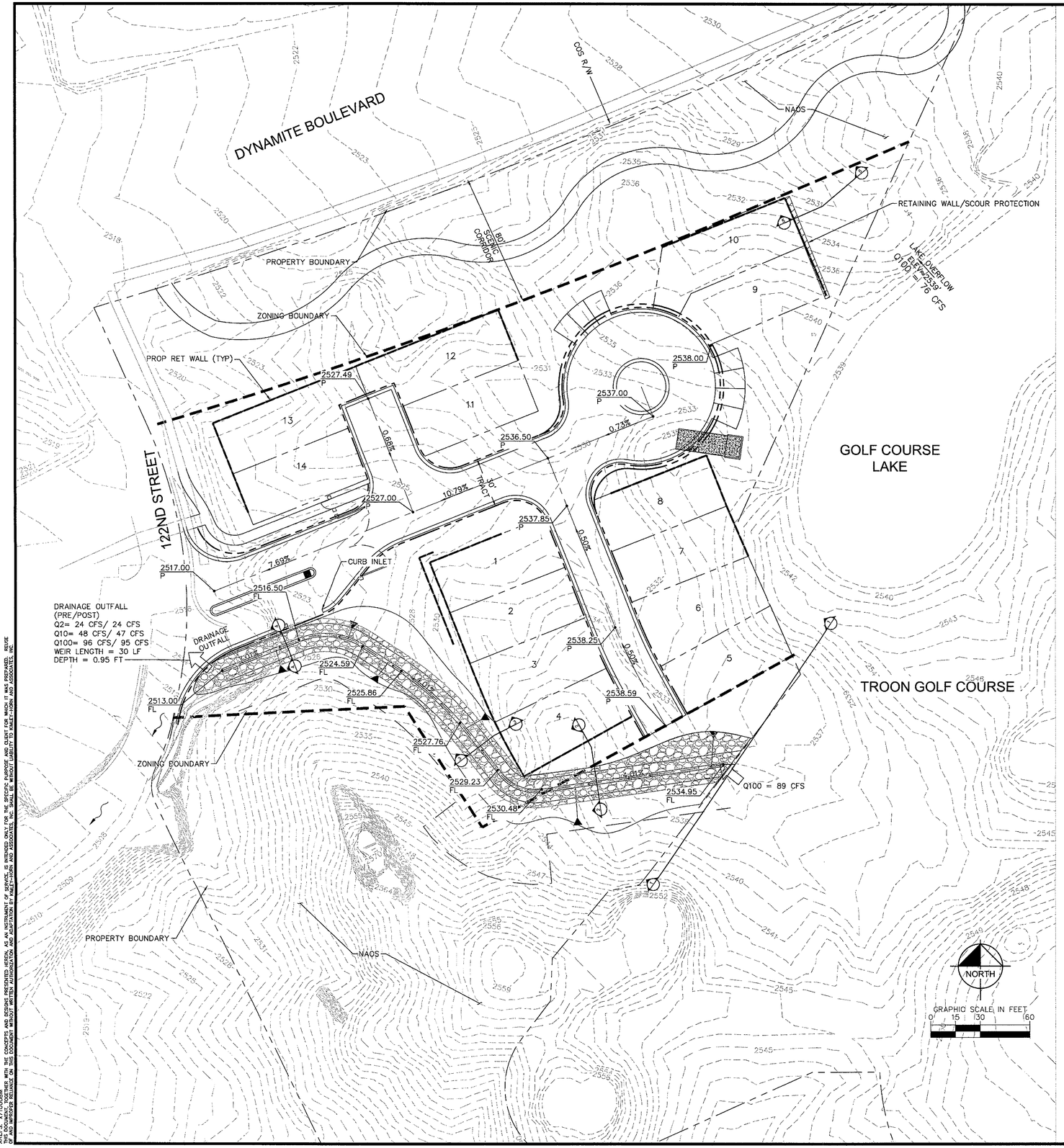
SCALE (H): 1"=50'
SCALE (V): NONE
DESIGNED BY: ZJH
DRAWN BY: ZJH
CHECKED BY: JMB
DATE: FEB 2017

VILLAGES AT TROON – PHASE 3
GRADING AND DRAINAGE PLAN
SCOTTSDALE, ARIZONA

PROJECT NO.
291071000

DRAWING NAME

1 OF 1



PROP DRAINAGE SWALE
EXISTING GRADE
1' MIN FREEBOARD
2' MAX
2.0' MIN

SECTION 1
NTS

EXISTING GRADE
LOT 4
2'
PROP DRAINAGE SWALE
2.0' MIN

SECTION 2
NTS

EXISTING GRADE
LOT 4
PROP RETAINING WALL
2'
PROP DRAINAGE SWALE
2.0' MIN

SECTION 3
NTS

EXISTING GRADE
2'
PROP DRAINAGE SWALE
2.0' MIN

SECTION 4
NTS

LOT 10
EXISTING GRADE
EXISTING DRAINAGE SWALE

SECTION 5
NTS

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE (H): 1"=30'
SCALE (V): NONE
DESIGNED BY: ZJH
DRAWN BY: ZJH
CHECKED BY: JMB
DATE: FEB 2017

VILLAGES AT TROON – PHASE 3
GRADING AND DRAINAGE PLAN
SCOTTSDALE, ARIZONA

PROJECT NO.
291071000

DRAWING NAME

1 OF 1

Appendix F Basin 3 Troon North Master Hydrology Report

BASIN 3
TROON NORTH
MASTER HYDROLOGY REPORT

TROON NORTH

ACCEPTED
MASTER DRAINAGE PLAN
REVIEWER:
DATE: 8/9/96
TRANSPORTATION PLANNING
This is not authorization to construct Det. Basin 3. This requires separate approval.

Gilbertson Associates, Inc.
Consulting Civil Engineers & Land Surveyors
(602) 585-6464

BASIN 3
TROON NORTH
MASTER HYDROLOGY REPORT

TROON NORTH

GAI 90129

Prepared by:

GILBERTSON ASSOCIATES, INC.
Consulting Civil Engineers
and Land Surveyors
23733 North Scottsdale Road, Suite B
Scottsdale, Arizona 85255-3465

August 2, 1996

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*           MAY  1991                   *
*     VERSION 4.0.1E                    *
*                                       *
*  RUN DATE  08/02/96  TIME  12:08:57   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX  XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
    1     ID   DETG9 NORTH HYDROLOGY
    2     ID   100 YEAR 6 HOUR STORM EVENT
    3     ID   PARCEL U SOLD TO ESTANCIA, NO DEVELOPMENT ASSUMED
    4     ID   FILE = 293D_100.DAT
    5     ID   DEVELOPED CONDITIONS, NEW SOILS DATA, GOOD CONDITIONS FOR GOLF
    6     ID   POOR SOIL CONDITIONS FOR ALL AREASOUTSIDE OF GOLF COURSE
    7     ID   BASIN 3D
    8     ID   OUTLET OF TERMINAL DETENTION BASIN = 3 RCPE 4.42' X 2.83' (JUNE 3, 1996)
          *DIAGRAM
    9     IT       4 01JAN96    0100     300
   10     IO       5

   11     KK     31A
   12     KM   RUNOFF FROM BASIN 31A
   13     BA  .00429
   14     KM   100 YEAR STORM
   15     PH             2.8     .75    1.47    2.49    2.82    3.04    3.45
   16     LS              87      10
   17     UK      50     .10      .3     100
   18     RK     500     .04    .025            TRAP       2      10

   19     KK   DETG2
   20     KM   ROUTE BASIN 31A THROUGH GOLF HOLE 2 DETENTION
   21     RS       1    STOR       0
   22     SA    .021    .135    .224    .285
   23     SE      48      50      52      53
   24     SQ       0       2     2.5       3

   25     KK   RTDG2
   26     KM   ROUTE DETG2 TO CP31
   27     RD
   28     RC    .045     .03    .045     560    .034
   29     RX       0       4       8      12    14.5    18.5    22.5    26.5
   30     RY       3       2       1       0       0       1       2       3

   31     KK     31B
   32     KM   RUNOFF FROM BASIN 31B
   33     BA .02549
   34     LS              86       8
   35     UK      50      .1      .3     100
   36     RK    1150    .035    .025            TRAP       2      10
   37     RK     560    .035     .04            TRAP     2.5       4

   38     KK    CP31
   39     KM   COMBINE 31B AND RTDG2
   40     HC       2

   41     KK    CLV1
   42     KM   ROUTE CP31 THROUGH CULVERT 1
   43     KM   2-30" CULVERTS
   44     RS       1    STOR       0
   45     SA       0   .0009   .0018   .0046    .014    .029    .043
   46     SE    2604    2605    2606    2607    2608    2609 2610.37
   47     SQ       0       7      16      29      38      45     100
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  141     KK     38
  142     KM   RUNOFF FROM BASIN 38
  143     BA  .06002
  144     LS              80      46
  145     UK      50     .05     .05     100
  146     RK    2129     .03     .04             TRAP       8       3

  147     KK     39B
  148     KM   RUNOFF FROM BASIN 39B
  149     BA    .033
  150     LS              86      15
  151     UK      70      .1     .25     100
  152     RK    1300     .05     .03             TRAP       2       4

  153     KK   DETG9
  154     KM   ROUTE BASIN 39B THROUGH DETENTION BASIN ON GOLF HOLE 9
  155     RS       1    STOR       0
  156     SA    1.16    1.20     1.2    1.21
  157     SE    35.5      36    36.5      37
  158     SQ       0      35      98     181

  159     KK    CLV4
  160     KM   ROUTE OUTFLOW FROM HOLE 9 DETENTION BASIN THROUGH DOUBLE 36"
  161     KM   CULVERT UNDER DYNAMITE ROAD
  162     RS       1    STOR       0
  163     SA       0   .0057    .025     .08    .152    .224
  164     SE   30.77      32      33      34      35      36
  165     SQ       0      19      46      78     105     128

  166     KK   RCLV4
  167     KM   ROUTE OUTFLOW FROM CULVERT 4 TO CP38, SECTION 5
  168     RD
  169     RC    .045     .03    .045    2224    .026
  170     RX       0       2       4       6      14      17      20      23
  171     RY       3       2       1       0       0       1       2       3

  172     KK     32A
  173     KM   RUNOFF FROM BASIN 32A
  174     BA  .01443
  175     LS              84      21
  176     UK      60      .1      .2     100
  177     RK     800    .044     .04             TRAP     2.5       4

  178     KK   RT32A
  179     KM   ROUTE 32A TO LARGE BOX CULVERT AT CART CROSSING
  180     RD
  181     RC    .03     .03     .03    2279    .037
  182     RX       0       4       8      12    14.5    18.5    22.5    26.5
  183     RY       3       2       1       0       0       1       2       3
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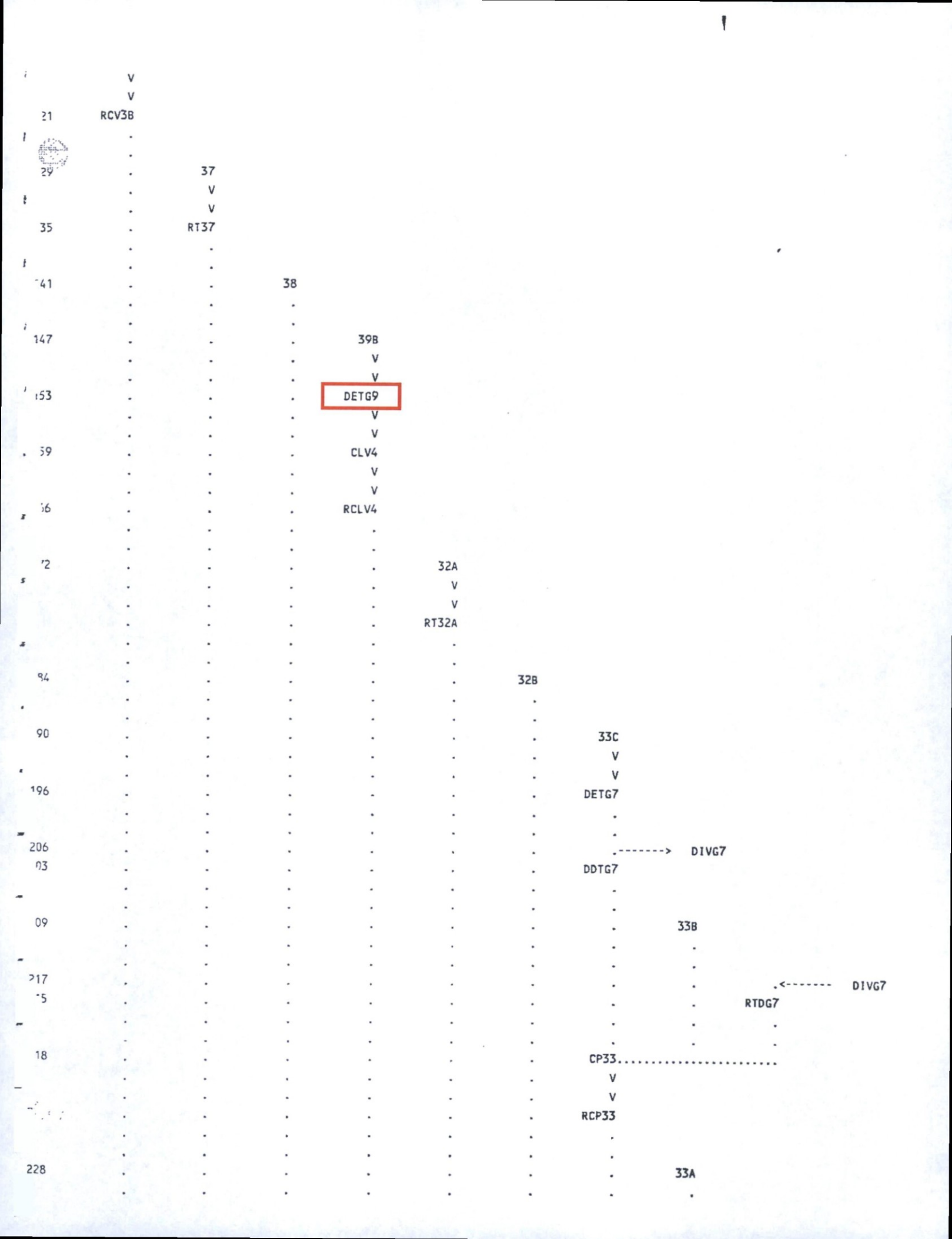
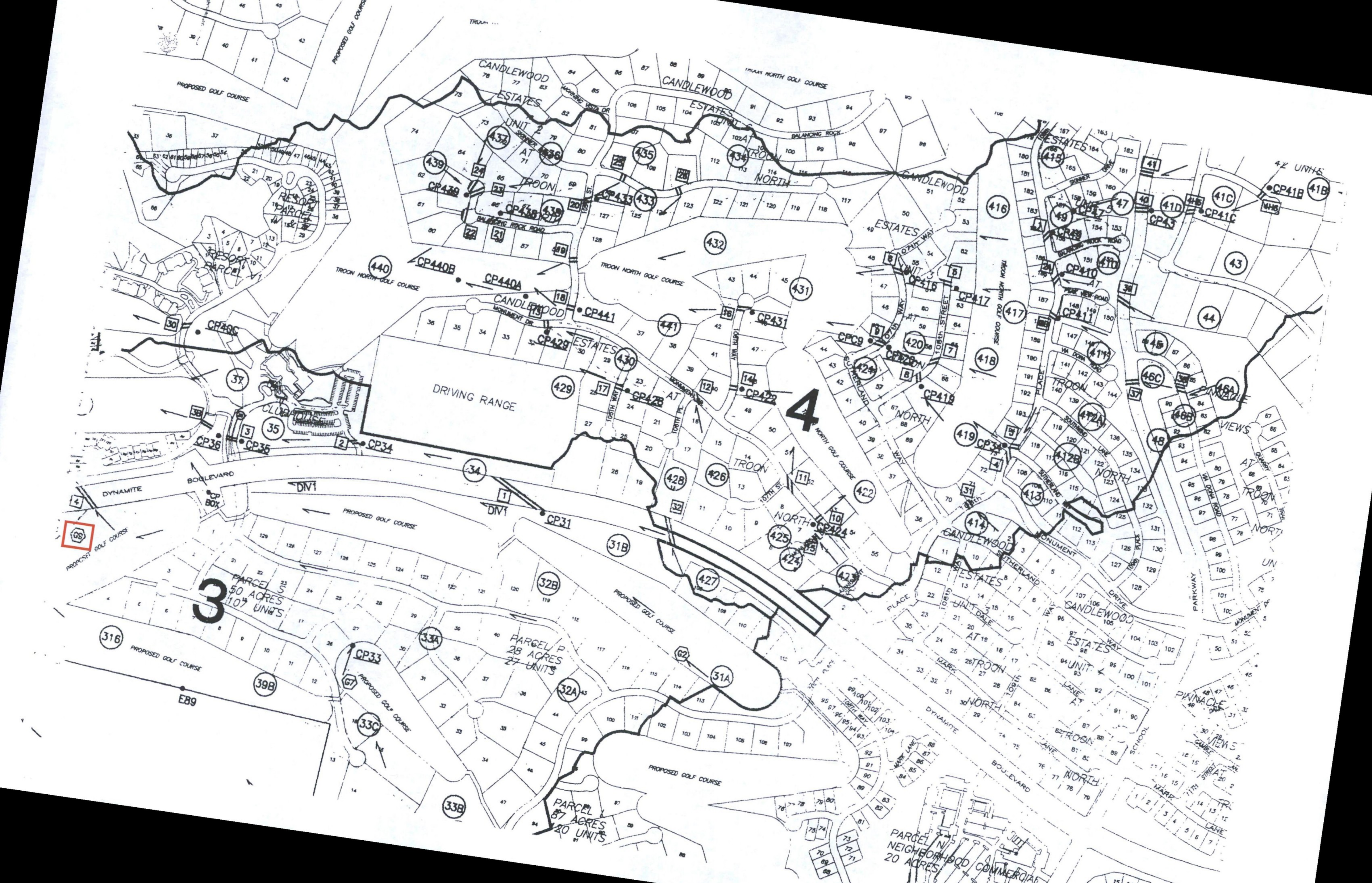

RCV3B
37
RT37
38
39B
DETG9
CLV4
RCLV4
32A
RT32A
32B
33C
DETG7
DIVG7
DDTG7
33B
DIVG7
RTDG7
CP33
RCP33
33A

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	31A	18.	3.07	1.	0.	0.	0.00		
ROUTED TO	DETG2	2.	3.53	1.	0.	0.	0.00	50.82	3.53
ROUTED TO	RTDG2	2.	3.20	1.	0.	0.	0.00		
HYDROGRAPH AT	31B	91.	3.07	6.	2.	2.	0.03		
2 COMBINED AT	CP31	92.	3.07	7.	2.	2.	0.03		
ROUTED TO	CLV1	88.	3.13	7.	2.	2.	0.03	2610.07	3.13
DIVERSION TO	DIV1	35.	3.13	1.	0.	0.	0.03		
HYDROGRAPH AT	DCLV1	53.	3.13	6.	2.	2.	0.03		
ROUTED TO	RCLV1	52.	3.13	6.	2.	2.	0.03		
HYDROGRAPH AT	34	39.	3.13	3.	1.	1.	0.01		
2 COMBINED AT	CP34	91.	3.13	10.	3.	3.	0.04		
ROUTED TO	CLV2	91.	3.13	10.	3.	3.	0.04	74.62	3.13
ROUTED TO	RCLV2	88.	3.20	10.	3.	3.	0.04		
HYDROGRAPH AT	35	32.	3.07	2.	1.	1.	0.01		
2 COMBINED AT	CP35	100.	3.20	12.	4.	4.	0.05		
ROUTED TO	CLV3	101.	3.20	12.	4.	4.	0.05	51.60	3.20
HYDROGRAPH AT	36	4.	3.07	0.	0.	0.	0.00		
2 COMBINED AT	CP36	102.	3.20	12.	4.	4.	0.05		
ROUTED TO	CLV3B	102.	3.20	12.	4.	4.	0.05	47.08	3.20
ROUTED TO	RCV3B	100.	3.40	12.	4.	4.	0.05		
HYDROGRAPH AT	37	38.	3.07	2.	1.	1.	0.01		
ROUTED TO	RT37	35.	3.20	2.	1.	1.	0.01		
HYDROGRAPH AT	38	244.	3.07	16.	5.	5.	0.06		
HYDROGRAPH AT	39B	130.	3.07	8.	2.	2.	0.03		
ROUTED TO	DETG9	76.	3.13	8.	2.	2.	0.03	36.32	3.13
ROUTED TO	CLV4	77.	3.20	8.	2.	2.	0.03	33.97	3.20


CANDLEWOOD ESTATES UNIT 2
CANDLEWOOD ESTATES
TROON NORTH GOLF COURSE
PROPOSED GOLF COURSE
RESORT PARCEL
CLUBHOUSE
DRIVING RANGE
DYNAMITE BOULEVARD
4
3
PARCEL S
50 ACRES
107 UNITS
PARCEL P
28 ACRES
27 UNITS
PARCEL L
87 ACRES
20 UNITS
PARCEL N
NEIGHBORHOOD COMMERCIAL
20 ACRES
PINNACLE VIEWS AT TROON NORTH
E89
CP31
CP33
CP34
CP35
CP36
CP40C
CP440A
CP440B
CP441
CP429
CP428
CP431
CP422
CP424
CP419
CP417
CP416
CP411
CP410
CP43
CP41B
CP41C
CP433
CP439
DIV1

TRAFFIC IMPACT AND MITIGATION ANALYSIS

Villages at Troon
Phase 3

Prepared For:

Asset Management

ACCEPTED
CITY OF SCOTTSDALE
TRANSPORTATION DEPARTMENT

DATE: April 7, 2017

REVIEWER: Ben Ruck

Kimley»Horn

291071000
November 2016

27-ZN-2016
12/9/2016

Kimley»Horn

November 10, 2016

Mr. Stephen Herman
Asset Management
2701 E. Camelback Road, Suite 170
Phoenix, AZ 85016

RE: Villages at Troon North – Phase 3 Scottsdale, Arizona
Traffic Impact & Mitigation Analysis (TIMA)

Dear Mr. Herman:

This letter report outlines our findings regarding the traffic generation comparison for the proposed Villages at Troon North – Phase 3 development located on the southeast corner of the intersection of 101st Way and Dynamite Boulevard in Scottsdale, Arizona, as it relates to development of the site for residential land uses as opposed to the original commercial land uses. The analysis compares the trip generating potential of the existing land uses under the current zoning to the trips generated by the proposed plan and zoning.

Original Site Plan and Access

The proposed residential development occupies the eastern portion of the original Village at Troon master plan. The original land use consisted of office, retail, bank and restaurant uses. Access to the development was provided by two access locations onto Dynamite Boulevard. One access located at 101st Way and the other at a median break approximately 750 feet west of 101st Way. A copy of the original site plan is attached.

Existing Traffic Volumes

Existing daily traffic volumes for 2014 were obtained from the City of Scottsdale's 2014 Average Daily Traffic Volumes map. The segment of Dynamite Boulevard between Pima Road and Alma School Road has an average daily traffic volume of 12,000 vehicles per day. A copy of the 2014 City of Scottsdale Average Daily Traffic Volumes are attached.

Original Land Use Trip Generation

The trip generation rates published by the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 9th Edition*, were used to determine the trip generation characteristics of the existing land uses. The trip generation calculation for the existing land use was based on ITE Code for the various land uses identified in the original master plan. The number of trips generated by the existing land use is calculated and shown in **Table 1**. Trip generation calculations are attached.

Table 1. Original Land Use Trip Generation

Land Use Description	ITE Code	Quantity	Units	Daily Trips	AM			PM		
					In	Out	Total	In	Out	Total
General Office	710	92,110	sq. ft.	1,016	127	17	144	23	114	137
Specialty Retail Center	826	25,900	sq. ft.	1,148				31	39	70
Drive-in Bank	912	6,200	sq. ft.	920	43	32	75	76	75	151
Quality Restaurant	931	19,500	sq. ft.	1756	13	3	16	98	48	146
Total Trips				**4,840**	**183**	**52**	**235**	**228**	**276**	**504**

As shown in **Table 1**, the original development was estimated to generate 4,840 daily trips with 235 trips occurring in the AM peak hour and 504 trips occurring in the PM peak hour.

Proposed Land Use Trip Generation

While the site access was developed per the original plan, only a portion of the original land uses were developed. The 3,800 square-foot bank on the west end of the site was constructed but the other portions of the overall plan, exclusive of the subject parcel, was developed as office condominiums totaling 124,523 square feet. The eastern portion of the site is proposed to be developed as 14 residential units under the current plan. A copy of the plan for the eastern portion of the site is attached. The development will continue to be accessed by the two existing site access driveways.

The trip generation rates published by the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 9th Edition,* were used to calculate the trip generation characteristics of the proposed land uses. The trip generation calculation for the proposed uses was based on ITE Code 230 for Residential Condominium and ITE Code 912 for Drive-In Bank. The number of trips generated by the proposed land uses is calculated and shown in **Table 2.** Trip generation calculations are attached.

Table 2. Proposed Land Use Trip Generation

Land Use Description	ITE Code	Quantity	Units	Daily Trips	AM			PM		
					In	Out	Total	In	Out	Total
Residential Condominium	230	D.U.	14	82	1	5	6	5	2	7
General Office	710	124,523	sq. ft.	1,374	171	23	194	32	154	186
Drive-in Bank	912	3,800	sq. ft.	546	26	20	46	46	46	92
Total Trips				**2,020**	**198**	**48**	**246**	**83**	**202**	**285**

As shown in **Table 2**, the proposed development has a trip generation potential of 2,020 daily trips with 246 trips occurring in the AM peak hour and 285 trips occurring in the PM peak hour.

Net Change Trip Generation

Changes from the original land use to the current land uses have resulted in changes to the development's trip generation. **Table 3** summarizes the net change in trip generation.

Table 3. Net Change in Trip Generation

Land Use Description	Daily Trips	AM			PM		
		In	Out	Total	In	Out	Total
Original Land Use	4,840	183	52	235	228	276	504
Current Proposed Land Use	2,020	198	48	246	83	202	285
Net Change	**(2,820)**	**15**	**(4)**	**11**	**(145)**	**(74)**	**(219)**

The calculations indicate that the proposed land uses are expected to result in an overall decrease in daily trips by approximately 58% (2,820 trips). During the AM peak hour, the overall proposed land uses will increase trip generation by 11 trips; during the PM peak hour, it will decrease trip generation by 219 trips when compared to the original land uses for the site.

Conclusions

The overall proposed plan will result in a significant reduction in daily trips and trips during the AM and PM peak hours compared to the original plan for the site. Therefore, the proposed plan will not impact traffic conditions in the vicinity of the development beyond that of the existing land uses.

If you have any further questions, please feel free to contact me at (602) 944-5500.

Very truly yours,

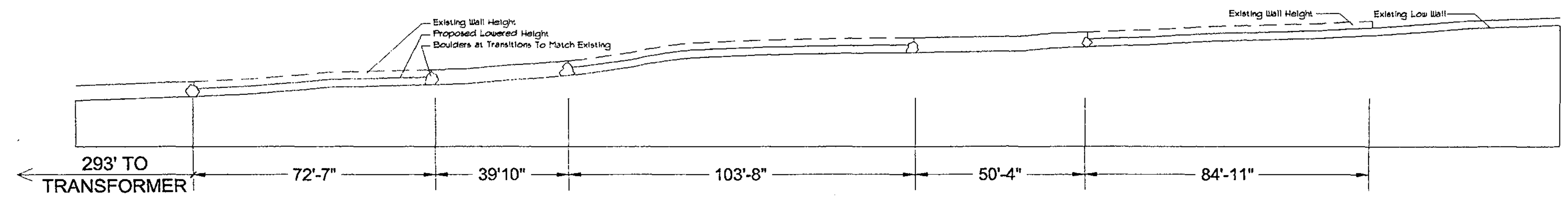
KIMLEY-HORN AND ASSOCIATES, INC.

Charles R. Wright, P.E.

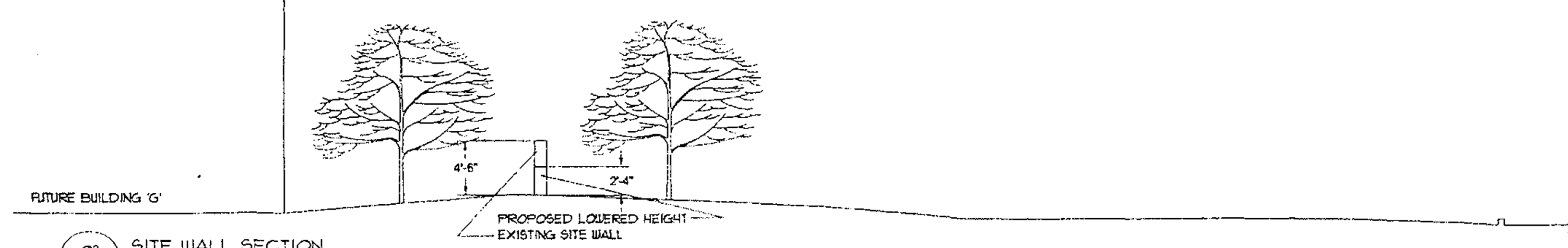
Attachments:

Site Plan
Traffic Volumes
Trip Generation Calculations

K:\EAV_Civil\291071000 - Villages at Troon\Reports\TIMA\trip gen with cover (revised).doc

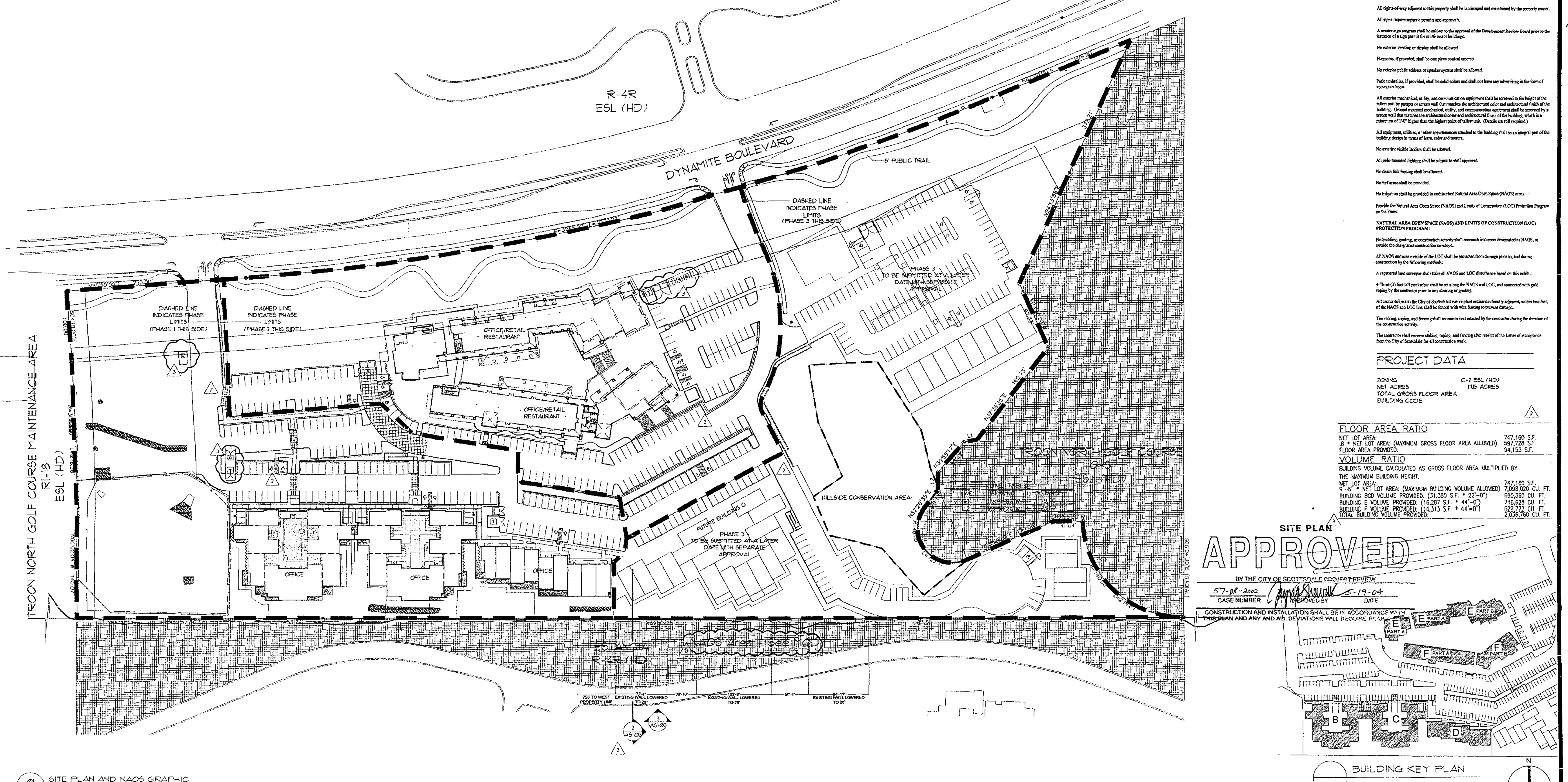


03 SITE WALL ELEVATION
1" = 20'-0"



02 SITE WALL SECTION
1/8" = 1'-0"

NOTE: AN ADDITIONAL 32 PARKING SPACES ARE REQUIRED TO BE SHOWN ON A SEPARATE SUBMITTAL OF THE REVISED CIVIL PLANS FOR PHASES I AND II, WHICH IS TO BE SUBMITTED BY JUNE 29, 2004. NO FOUNDATION PERMIT SHALL BE ISSUED FOR ANY PHASE II BUILDING UNTIL THE REVISED CIVIL PLAN SUBMITTAL WITH ADDITIONAL PARKING HAS BEEN APPROVED. (SEE CIVIL PLANS FOR OWNERS CERTIFICATION)



01 SITE PLAN AND NAOS GRAPHIC
1" = 60'-0"

SITE PLAN
APPROVED
BY THE CITY OF SCOTTSDALE PROJECT REVIEW
57-DR-2002
CASE NUMBER APPROVED BY 5-19-04 DATE
CONSTRUCTION AND INSTALLATION SHALL BE IN ACCORDANCE WITH THIS PLAN AND ANY AND ALL DEVIATIONS WILL REQUIRE RE-APPROVAL

PARKING SUMMARY: PHASE 1

Parking Required @ 1/300	Total Parking Spaces	Cover Parking Provided	Handicap Spaces Provided	Covered Handicap Space Provided	Van Accessible Spaces	Covered Van Accessible Spaces	Percentage of Covered Parking	Percentage of Handicap Parking	Percentage of Covered Handicap Parking	Percentage of Covered Van Accessible Parking
105	126	42	6	2	1	1	33.33	4.76	4.76	100

BICYCLE PARKING REQUIRED: 126/10 — 13 SPACES REQUIRED
BICYCLE PARKING PROVIDED: 14 SPACES PROVIDED

PARKING SUMMARY: PHASE 1 & 2

	FLOOR AREA			REQUIRED PARKING			
Building Designation	Retail	Office	Restaurant	Retail Pkg	Office Pkg	Rest. Pkg	Building Total
				0	0	0	0
B,C,D		30960		0	103	0	31380
E,F	25158	24219	7000	101	81	93	35270
				0	0	0	30553
				RETAIL	OFFICE	RESTAURANT	
TOTAL PARKING				101	184	93	

	RETAIL	OFFICE	RESTAURANT
TOTAL SF	25158	55179	7000

SHARED PARKING ANALYSIS

Weekdays			Weekends			
Mid - 7:00 a.m.	7:00 a.m. - 6:00 p.m.	6:00 p.m. - Mid	Mid. - 7:00 a.m.	7:00 a.m. - 6:00 p.m.	6:00 p.m. - Mid	
9	184	9	0	110	18	
0	101	81	0	101	60	
47	65	93	42	65	93	
56	350	183	42	276	172	Total

*The highest number in the total req'd line above is the number of spaces required under this shared parking model

SHARD PKG. RQT (from table above)	350 CARS
PARKING PROVIDED	318 CARS
SHORTFALL v. MODEL	32 CARS

ACCESSIBLE PARKING SPACES REQUIRED: (.04% OF TOTAL SPACES REQ.) 13 SPACES REQ'D
(PHASE 1-2) (INCLUDING 2 VAN ACCESSIBLE SPACE)
ACCESSIBLE PARKING SPACES PROVIDED: 16 SPACES PROVIDED
(PHASE 1-2) (INCLUDING 3 VAN ACCESSIBLE SPACE)

COVERED SPACES PROVIDED: 62 SPACES 5% OF TOTAL SPACES
H.C. SPACES PROVIDED: 4 SPACES 6.5% OF PROVIDED COVERED PARKING
BICYCLE PARKING REQUIRED: (1/10 PARKING SPACES) (317/10) 32 SPACES REQUIRED
BICYCLE PARKING PROVIDED: 34 SPACES PROVIDED

NAOS CALCULATIONS

SITE AREA	747,160 SF	17.15 ACRES
HILLSIDE CONSERVATION	40240 SF	5.4%
FAR ALLOWED	.20	
PROVIDED FAR	.1914	
REQUIRED NAOS	223,314 SF	29.89%
PROVIDED NAOS	233,209 SF	31.21 %
PROVIDED UNDISTURBED	156,443 SF	70.06%
PROVIDED REVEG.	76,766 SF	

OPEN SPACE CALCULATIONS

ZONING C-2 (ESL HD)

BUILDING HEIGHT:

BUILDINGS ADJACENT TO THE SOUTH PROPERTY LINE: ALL BUILDINGS ADJACENT TO THE SOUTH PROPERTY LINE SHALL NOT EXCEED TWENTY-TWO (22) FEET IN HEIGHT AS MEASURED FROM THE FINISHED FLOOR, AND THIRTY (30) FEET AS MEASURED FROM NATURAL GRADE, PER THE APPROVED ZONING CASE 10-ZN-2002.

FOR ALL OTHER BUILDINGS: MAXIMUM BUILDING HEIGHT SHALL BE THIRTY-SIX (36) FEET AS MEASURED FROM EXISTING NATURAL TERRAIN ELEVATION PRIOR TO GRADING.

REQUIRED OPEN SPACE
FIRST 12' = 10% x NET LOT AREA
= 10% x 747,160 = 74,716
NEXT 32' = 32 x .0004% x 747,160 = 95,636
74,716 SF + 95,636 SF = 170,352 SF (22.8%)

PARKING LOT LANDSCAPING
REQUIRED : PARKING LOT AREA x 15%
217,981 SF x 15% = 32,697 SF
PROVIDED: 39,117 SF

SITE AREA	747,160 SF	17.15 ACRES
HILLSIDE CONSERVATION	40240 SF	5.4%
FAR ALLOWED	.20	
PROVIDED FAR	.1914	
PROVIDED OPEN SPACE	384,534 SF	51.47%

NOTE: AREAS THAT ARE NOT HATCHED INDICATE OPEN SPACE IN EXCESS OF REQUIREMENTS

PLANNING NOTES

Sight distance triangles shall be shown on final plans for driveways from commercial sites and any intersections. Area within the safety triangle is to be clear of landscaping, signs, or other visibility obstructions with a height greater than 2 feet. Trees within the safety triangle shall have a canopy that begins at 7 feet in height upon installation. All heights are measured from nearest street line elevation.

All rights-of-way adjacent to this property shall be landscaped and maintained by the property owner.

All signs require separate permits and approvals.

A master sign program shall be subject to the approval of the Development Review Board prior to the issuance of a sign permit for multi-tenant buildings.

No exterior vending or display shall be allowed

Flagpoles, if provided, shall be one piece conical tapered.

No exterior public address or speaker system shall be allowed.

Patio umbrellas, if provided, shall be solid colors and shall not have any advertising in the form of signage or logos.

All exterior mechanical, utility, and communication equipment shall be screened to the height of the tallest unit by parapet or screen wall that matches the architectural color and architectural finish of the building. Ground mounted mechanical, utility, and communication equipment shall be screened by a screen wall that matches the architectural color and architectural finish of the building, which is a minimum of 1'-0" higher than the highest point of tallest unit. (Details are still required.)

All equipment, utilities, or other appurtenances attached to the building shall be an integral part of the building design in terms of form, color and texture.

No exterior visible ladders shall be allowed.

All pole-mounted lighting shall be subject to staff approval.

No chain link fencing shall be allowed.

No turf areas shall be provided.

No irrigation shall be provided to undisturbed Natural Area Open Space (NAOS) areas.

Provide the Natural Area Open Space (NAOS) and Limits of Construction (LOC) Protection Program on the Plans:

NATURAL AREA OPEN SPACE (NAOS) AND LIMITS OF CONSTRUCTION (LOC) PROTECTION PROGRAM:

No building, grading, or construction activity shall encroach into areas designated as NAOS, or outside the designated construction envelope.

All NAOS and area outside of the LOC shall be protected from damage prior to, and during construction by the following methods:

A registered land surveyor shall stake all NAOS and LOC disturbance based on this exhibit.

± Three (3) foot tall steel rebar shall be set along the NAOS and LOC, and connected with gold roping by the contractor prior to any clearing or grading.

All cactus subject to the City of Scottsdale's native plant ordinance directly adjacent, within two feet, of the NAOS and LOC line shall be fenced with wire fencing to prevent damage.

The staking, roping, and fencing shall be maintained intacted by the contractor during the duration of the construction activity.

The contractor shall remove staking, roping, and fencing after receipt of the Letter of Acceptance from the City of Scottsdale for all construction work.

PROJECT DATA

ZONING	C-2 ESL (HD)
NET ACRES	17.15 ACRES
TOTAL GROSS FLOOR AREA	
BUILDING CODE	

FLOOR AREA RATIO

NET LOT AREA:	747,160 S.F.
.8 * NET LOT AREA: (MAXIMUM GROSS FLOOR AREA ALLOWED)	597,728 S.F.
FLOOR AREA PROVIDED:	94,153 S.F.

VOLUME RATIO

BUILDING VOLUME CALCULATED AS GROSS FLOOR AREA MULTIPLIED BY THE MAXIMUM BUILDING HEIGHT.

NET LOT AREA:	747,160 S.F.
9'-6" * NET LOT AREA: (MAXIMUM BUILDING VOLUME ALLOWED)	7,098,020 CU. FT.
BUILDING BCD VOLUME PROVIDED: (31,380 S.F. * 22'-0")	690,360 CU. FT.
BUILDING E VOLUME PROVIDED: (16,287 S.F. * 44'-0")	716,628 CU. FT.
BUILDING F VOLUME PROVIDED: (14,313 S.F. * 44'-0")	629,772 CU. FT.
TOTAL BUILDING VOLUME PROVIDED:	2,036,760 CU. FT.

RSP Architects
502 S. College Ave.
Suite 203
Tempe, AZ 85281
480.889.2000
480.889.2099 fax
www.rsparch.com

Project For

Pinnacle Estancia Retreats
7209 Ho Road, Suite 16
POB 5061
Carefree, AZ 85377
Contact: Doug Dragoo
Tel (480) 488 0350
Fax (480) 488 4780

Certification

REGISTERED ARCHITECT CERTIFICATE NO. 13470 JOSEPH A. TYNDALL Date Signed 5-19-04 ARIZONA, U.S.A.

VILLAGE AT TROON
10011 E DYNAMITE BLVD.
SCOTTSDALE ARIZONA

Project Team:

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Fax. : (480) 889-2099

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Fax (623) 536 9443

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Fax (480) 922 3739

MPE ENGINEERS
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Phoenix, AZ 85020
Contact: John Schell
Tel (602) 943 4116
Fax (602) 943 2507

782-03 57-DR-02 63-VP-03

Project No.	1432.001.00
Drawn By	NF
Checked By	
Date	05 May 2004

Mark	Date	Description
4	05-14-04	City Comments
3	03-26-04	City Comments
2	11-19-03	City Comments

OVERALL SITE PLAN

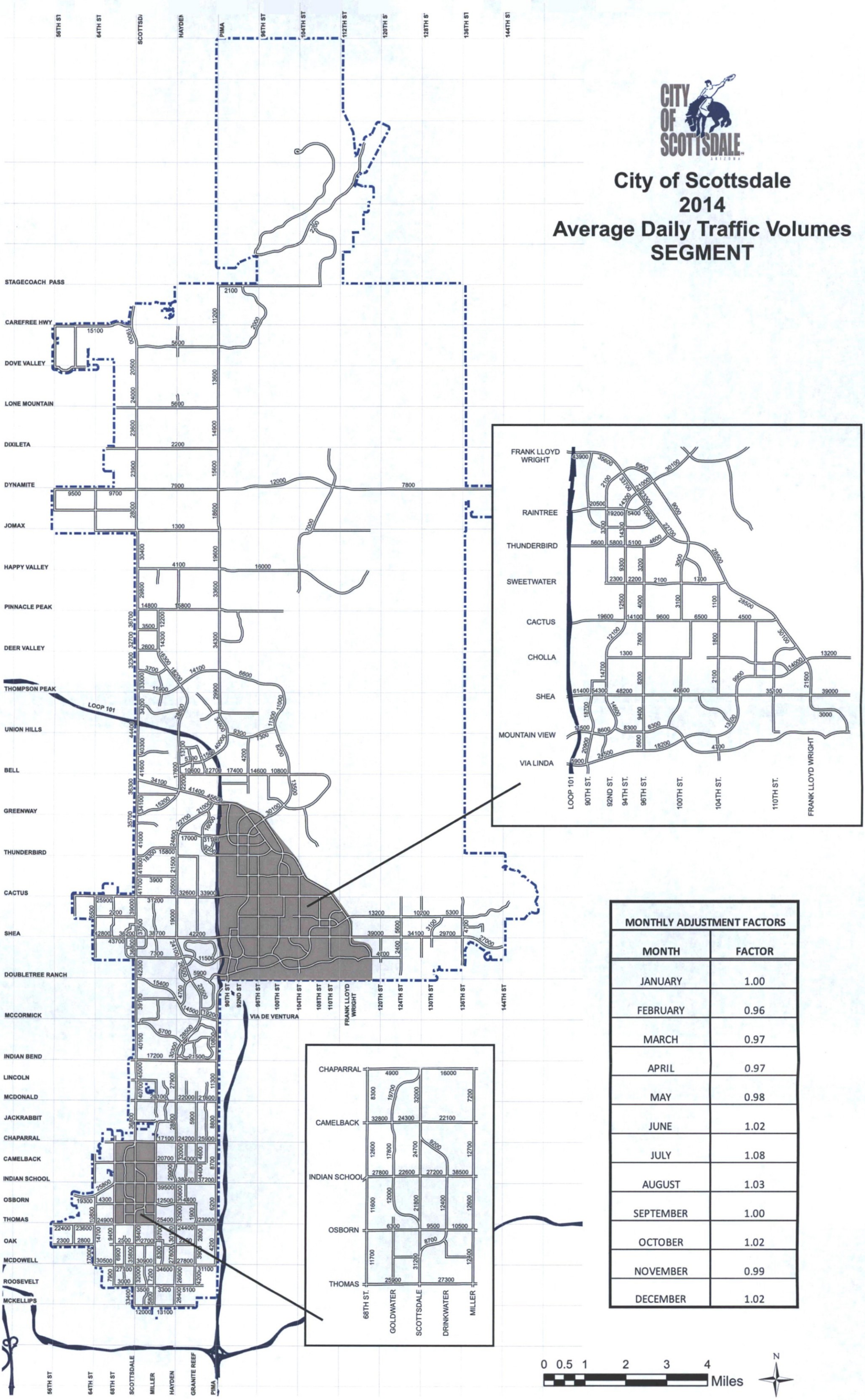
SCANNED 1/19/05 af

57-DR-2002

AS1.02

Final plans - site plan

City of Scottsdale
2014
Average Daily Traffic Volumes
SEGMENT



MONTHLY ADJUSTMENT FACTORS	
MONTH	FACTOR
JANUARY	1.00
FEBRUARY	0.96
MARCH	0.97
APRIL	0.97
MAY	0.98
JUNE	1.02
JULY	1.08
AUGUST	1.03
SEPTEMBER	1.00
OCTOBER	1.02
NOVEMBER	0.99
DECEMBER	1.02

Trip Generation Planner (ITE 9th Edition) - Summary Report

Kimley»Horn

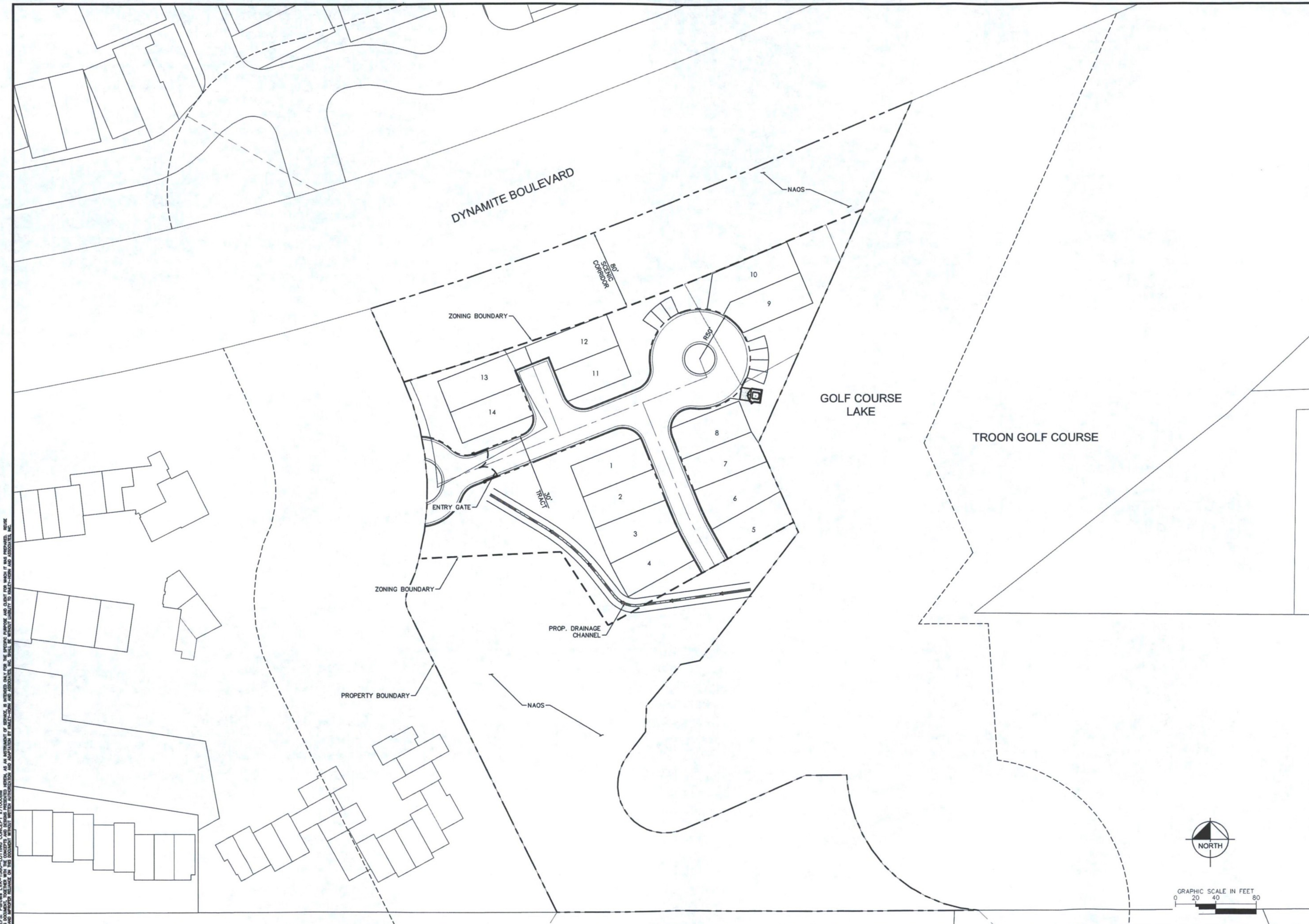
Weekday Trip Generation
Trips Based on Average Rates/Equations

Project Name
Project Number

ITE Code	Internal Capture Land Use	Land Use Description	Independent Variable	No. of Units	Avg Rate or Eq	Rates: Daily Rate	Rates: AM Rate	Rates: PM Rate	Total Trips: Daily Trips	Total Trips: AM Trips	Total Trips: PM Trips	Total Trips: AM Trips In	Total Trips: AM Trips Out	Total Trips: PM Trips In	Total Trips: PM Trips Out	Net Trips after Internal Capture: Daily Trips	Net Trips after Internal Capture: AM Trips	Net Trips after Internal Capture: PM Trips	Net Trips after Internal Capture: AM Trips In	Net Trips after Internal Capture: AM Trips Out	Net Trips after Internal Capture: PM Trips In	Net Trips after Internal Capture: PM Trips Out	Net Trips after Internal Capture & Pass-By: Daily Trips	Net Trips after Internal Capture & Pass-By: AM Trips	Net Trips after Internal Capture & Pass-By: PM Trips	Net Trips after Internal Capture & Pass-By: AM Trips In	Net Trips after Internal Capture & Pass-By: AM Trips Out	Net Trips after Internal Capture & Pass-By: PM Trips In	Net Trips after Internal Capture & Pass-By: PM Trips Out
710	Select Use	General Office Building (1)	1,000 Sq Ft	92.11	Avg	11.03	1.56	1.49	1016	144	137	127	17	23	114	1016	144	137	127	17	23	114	1016	144	137	127	17	23	114
826	Select Use	Specialty Retail Center	1,000 Sq Ft GLA	25.9	Avg	44.32	*	2.71	1148		70			31	39	1148		70			31	39	1148		70			31	39
912	Select Use	Drive-In Bank	1,000 Sq Ft	6.2	Avg	148.15	12.08	24.30	920	75	151	43	32	76	75	920	75	151	43	32	76	75	920	75	80	43	32	40	40
931	Select Use	Quality Restaurant	1,000 Sq Ft	19.5	Avg	89.95	0.81	7.49	1756	16	146	13	3	98	48	1756	16	146	13	3	98	48	1756	16	82	13	3	55	27
								Totals	4840	235	504	183	52	228	276	4840	235	504	183	52	228	276	4840	235	369	183	52	149	220

Notes:
(1) AM and/or PM rates correspond to peak hour of generator

A Trip Generation data from ITE *Trip Generation, 9th Edition*
B AM/PM rates correspond to peak of adjacent street traffic (if data available)
C Includes weekday rates only
D Total trips include pass-by trips w/ no internal capture
E Pass-by rates from ITE *Trip Generation Handbook, 2nd Edition*
F Internal capture rates from ITE *Trip Generation Handbook, 2nd Edition*
G Worksheet is intended as a planning tool. Verify results w/ ITE *Trip Generation 9th Edition*



NO. | REVISION | BY | DATE | APPR.

VILLAGES AT TROON – PHASE 3
ZONING SITE PLAN
EXHIBIT
SCOTTSDALE, ARIZONA

SCALE (H): 1"=60'
SCALE (V): NONE
DESIGNED BY: ZJH
DRAWN BY: ZJH
CHECKED BY: JMB
DATE: OCT 2016

Kimley»Horn

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

Registered Professional Engineer (Civil)
CERTIFICATE NO. 52081
JASON M. BURM
ARIZONA, U.S.A.

PROJECT NO. 291071000
DRAWING NAME

1 OF 1

Trip Generation Planner (ITE 9th Edition) - Summary Report

Kimley»Horn

Weekday Trip Generation
Trips Based on Average Rates/Equations

Project Name
Project Number

ITE Code	Internal Capture Land Use	Land Use Description	Independent Variable	No. of Units	Avg Rate or Eq	Rates: Daily Rate	Rates: AM Rate	Rates: PM Rate	Total Trips: Daily Trips	Total Trips: AM Trips	Total Trips: PM Trips	Total Trips: AM Trips In	Total Trips: AM Trips Out	Total Trips: PM Trips In	Total Trips: PM Trips Out	Net Trips after Internal Capture: Daily Trips	Net Trips after Internal Capture: AM Trips	Net Trips after Internal Capture: PM Trips	Net Trips after Internal Capture: AM Trips In	Net Trips after Internal Capture: AM Trips Out	Net Trips after Internal Capture: PM Trips In	Net Trips after Internal Capture: PM Trips Out	Net Trips after Internal Capture & Pass-By: Daily Trips	Net Trips after Internal Capture & Pass-By: AM Trips	Net Trips after Internal Capture & Pass-By: PM Trips	Net Trips after Internal Capture & Pass-By: AM Trips In	Net Trips after Internal Capture & Pass-By: AM Trips Out	Net Trips after Internal Capture & Pass-By: PM Trips In	Net Trips after Internal Capture & Pass-By: PM Trips Out
230	Select Use	Residential Condominium/Townhouse	Dwelling Unit(s)	14	Avg	5.81	0.44	0.52	82	6	7	1	5	5	2	82	6	7	1	5	5	2	82	6	7	1	5	5	2
710	Select Use	General Office Building (1)	1,000 Sq Ft	124.52	Avg	11.03	1.56	1.49	1374	194	186	171	23	32	154	1374	194	186	171	23	32	154	1374	194	186	171	23	32	154
912	Select Use	Drive-In Bank	1,000 Sq Ft	3.8	Avg	148.15	12.08	24.30	564	46	92	26	20	46	46	564	46	92	26	20	46	46	564	46	49	26	20	24	24
	Select Use																												
								Totals	2020	246	285	198	48	83	202	2020	246	285	198	48	83	202	2020	246	242	198	48	61	180

Notes:
(1) AM and/or PM rates correspond to peak hour of generator

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